

April 5, 1930

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AVIATION

The Oldest American Aeronautical Magazine



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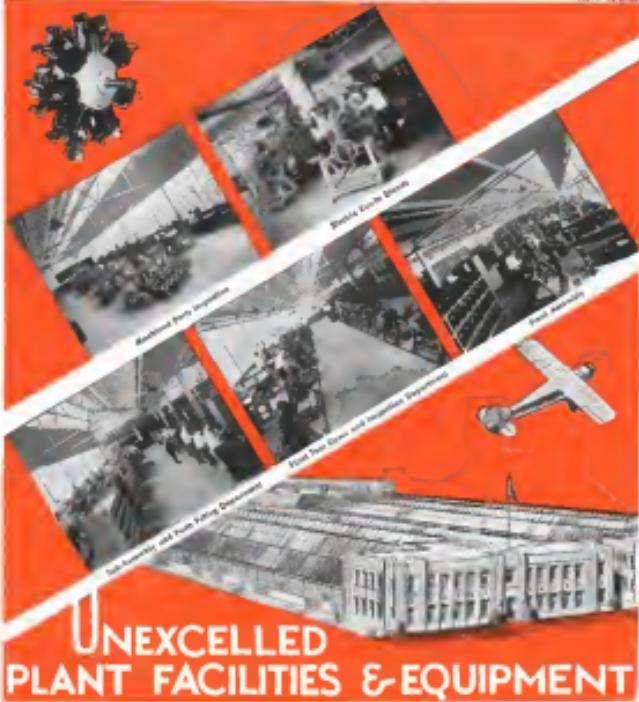
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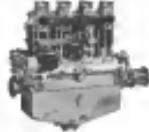
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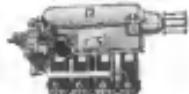
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Entries Close July 7th

Minimum number of starters—15

Winners to be determined by
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AVIATION
April 2, 1934



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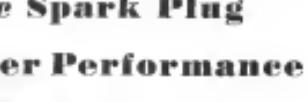
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—A STATEMENT FROM G. M. BELLANCA

1 . .

THIS BELLANCA PACIFICAER is the first reason why we are confident that our line of aircraft will prove to be the planes of first choice for efficiency. The Pacificer has proved its superior qualities in the rugged terrain of the West Coast and the Midwest. It is now presented with added side Wright Whirlwind (or the Pratt & Whitney Wasp power increasing still further the place occupied by original enclosed plane type) show the with the Pacificer we are applying a different standard for quality planes equally successful for operation on wheels, gear, float or skis.



The Pacificer

2 . .

THIS BELLANCA SKYROCKET is our second reason for predicting dominance in 1938. Equipped with the efficient early Pratt & Whitney Wasp engine, a plane of increased power and dimensions, the Skyrocket retains all of the well-known characteristics of the Pacificaler including outstanding qualities of quietness, steady climb, high speed, economy and maneuverability. Its full speed is over 150 m.p.h. on each cylinder at 750 r.p.m., and it has twice the life. The Skyrocket is already now a history plane.



The Skyrocket

3 . .

THIS BELLANCA AIRBUS is a 10 to 12 place plane with large, comfortable cabin, designed for airline operations. It carries 10 passengers and one pilot, or 11 passengers and two pilots. It is the largest plane ever built for the purpose. Through our most experimental methods and flight testing that other plane is ready to enter service in 1938. We have given it a wingspan of 54 ft. 8 in., and the interchangeable engine requires no modification. The result is an exceptionally roomy cabin, a spacious baggage compartment, the ability to carry a load of 1,000 lbs. and a useful load of 400 lbs., with 10 more, on either wheel gear or floats, making total weight 5,000 lbs. At 1,000 lbs. per c.c. the engine rating is 175 h.p. to 1,400 r.p.m. This is a very good number for economy and a reasonable cycle of service capacity. This is also a great number for maneuverability, stability and load. And behind these are many other reasons and facts which make deployment with no time to argue.

G. M. BELLANCA, Pres.
BELLANCA AIRCRAFT CORPORATION
NEW CASTLE, DELAWARE

BELLANCA



*In
Nicaragua*
CORSAIRS
helped make
Marine Air History



THE situation the U. S. Marines met in Nitengau was not just one of revolutionaries, bandits, outlaws. It was complicated by the character of the country itself—mountainous, jungle-covered, inaccessible.

for the Marines. Baudin's volunteers had reckoned without Corse. The Marines had brought with them a squadron of Corsairs, of which Corsair A.7532 was one. And it was not long before

CHANCE YOUGHT CORPORATION



Marine officers learned that their
Cassars were the direct solution of
most of their problems.

...was assigned to the 1st Pursuit Group from the factory to Nicosia where it was assigned, for duty with the V.O.T.M. Squadron. In Nicosia the A-38D and its sister Corsair performed a multiplicity of duties—acrobatics; light bombing; clearing out revolutionaries; ambush raids; even extraction of wounded. All this keen performance under tropical sun-

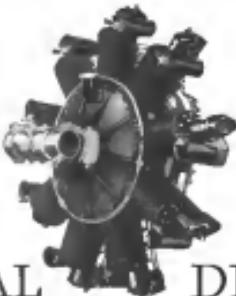
trains, difficult over-time conditions.

passenger coast patrols are in use day and night under such conditions. How Mariner Corvairs performed as Mariners is a matter of record.

The Corvair Mariner's cockpit is built in the memory of Mariner aviation.

CHANCE VUGHT CORPORATION,
Long Island City, New York. Division of United Aircraft & Transport
Corporations.

PACKARD



RADIAL DIESEL AIRCRAFT ENGINE

PACKARD—the "Master Motor Builders"—announces the first public showing of the Packard-Diesel Aircraft Engine at the All-American Aircraft Show, Detroit, April 5-13.

This revolutionary new engine will be exhibited by Packard in spaces 13-15, Hoover Airway. Several leading aircraft manufacturers will also exhibit planes on which the Packard-Diesel is standard equipment.

The Packard-Diesel Aircraft Engine has successfully met the Department of Commerce requirements for an approved type-certificate and has been

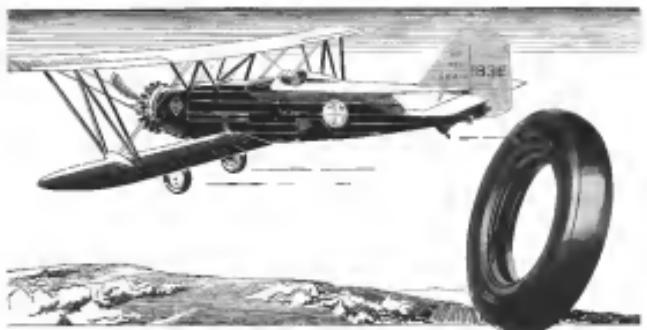
officially rated at 225 H.P. It is now in quantity production and will soon be seen on planes at many flying fields. In view of this, arrangements are rapidly being perfected to provide fuel at all airports.*

You are cordially invited to inspect the Packard-Diesel Aircraft Engine—see how easily it starts, how quickly it warms up, how smoothly it operates at all speeds. Flight demonstrations in Packard-owned planes will be available to interested aircraft manufacturers during the week of the Show at the Detroit City Airport.

PACKARD MOTOR CAR COMPANY
DETROIT, MICHIGAN

**The Thaw Company has already arranged for supply throughout their international distributing system to the U. S., Canada and Mexico.*

Air-Minded for 22 Years



Aviation is no new plaything with the United States Rubber Company. It has been a business with U. S. since 1908. The world's first airplane tire was the first contribution of U. S. engineers to safer, more economical flying. Since that historic development many U. S. contributions to aviation have followed—larger, tougher tires—then today's Web-Cord tires of still stronger but lighter construction. U. S. offers today's aircraft manufacturers a rubber engineering service that is air-minded by experience rather than by fancy. Here you will find competent assistance with any aviation problems in which rubber plays a part.

UNITED STATES RUBBER COMPANY—WORLD'S LARGEST PRODUCER OF RUBBER

U. S. ROYAL AIRPLANE TIRES



Speeding up airplane production and servicing

with Curtis compressed air equipment

FULLY as important as the speed of planes is the speeding up of the building, maintenance and servicing of planes. Executives throughout the aviation industry are rapidly coming to realize that compressed air is one of the most important factors in increasing speed and thoroughness.

Obviously, time, labor and money are saved in very appreciable measure by compressed air equipment such as—

Curtis 5 Horse
Compressor Unit
100 cu. ft. per min.
125 lbs. pressure



Curtis Compressor unit
to 10 H.P. with complete
air system for all purposes



Curtis Air Hoist,
complete
unit for tire work



Curtis Portable Air Tank
unit for tire work
from the main source of power



Model No. 4200

CURTIS TIMKEN EQUIPPED COMPRESSOR⁸⁸⁰⁸⁸—providing air for spray painting, spraying dyes on the wings, tire inflation, cleaning stock, airbrushes, spray cleaning engines, spraying of glass solvent or paint removers, air drying of parts dipped in cleaning solvents, blowing out dust, chips, insect work benches and drilling processes; air power for a pneumatic air hoist, receivers, portable drills, sand blasters, pneumatic water systems, etc.

CURTIS AIR HOISTS—Draw hoists at little more than the cost of chain blocks. Used with a Curtis-B-Bair Trolley or Crane, they can serve a wide floor area. Used for moving engine, propellers, manifolds, generators, engines, and other heavy parts, where a combination of power, speed and economy is important economy. Because there are no delicate mechanisms, even unskilled laborers can operate Curtis Hoists without danger of throwing them out of commission.

CURTIS AIR TANKS—Portable tanks for taking air out to a plane away from the usual source of supply. Stationary tanks for use with compressor unit in the shop, also portable tanks for mounting on service trucks.

CURTIS

St. Louis

The Curtis Flying Machine Co.,
St. Louis, Mo., is a producer of aircraft
since 1908. These machines of aeronautical
value have been sold to every state in the Union
and shipped into foreign countries around the world.
Curtis aircraft are used in all types of flying,
passenger, freight and mail, and are regularly used
in aerial surveys, crop protection and aerial
mining.

Write for Catalogue C-36 and state the product, etc.

814 Kildare Ave., St. Louis
800 AF Holman Tree, Mo. 8



**Just Read
The LETTER**

NEW STANDARD AIRCRAFT CORPORATION
Peterson Air Corp.

DEPARTMENT OF AIR MAIL DIVISION

St. Paul, Minn.
Hennepin & Franklin Aves.
Minn., U.S.A.

Mr. C. C. Peterson,
Peterson Air Corp.
St. Paul, Minn.

January 15th, 1931.

Many of our planes and the
standard aircraft parts have been used in
the construction of the new Boeing
airplane. Both airplanes and *Titanine*
parts are now available. We invite
you to take advantage of the
good products we offer.

Many of our planes and the
standard aircraft parts have been used in
the construction of the new Boeing
airplane. Both airplanes and *Titanine*
parts are now available. We invite
you to take advantage of the
good products we offer.

We wish to thank Mr. E. F. Peterson
for his interest in our products and
his desire to help us in our efforts to
improve our representation. He is an
experienced man whose presence on our
committee will be a great asset.

Very truly yours,

The Standard Aircraft Corporation,
Charles K. Doty
President, St. Paul,
Minnesota.

old 30

TITANINE
REGISTERED TRADE MARK.



Speeding Your Letters on . . .

WINGS OF CO-VE-CO!

HERE is a plane built exclusively for the transportation of mail and express, fuselage of metal with wings of Co-Ve-Co. Breeze Aircraft of Portland, Oregon, selected Co-Ve-Co because it was the best. Co-Ve-Co plywood was manufactured without steaming or treating in any way. Logs cut cold retain all the strength endowed by living trees. This is the secret of Co-Ve-Co durability; here is the reason for Co-Ve-Co's strength and stability.

resistance to resistance absorption.... Aircraft engineers have found that Co-Ve-Co Port Oxford Code and Co-Ve-Co Silesia Spruce combine exceptional lightness with a strength factor found in no other wood, that is why an ever increasing number of new planes "tie the Ve-Co-Be... You too should investigate Co-Ve-Co plywood. Standard sizes stocked for immediate shipment or, if you prefer, Co-Ve-Co can be manufactured to your size specifications and requirements.

和合四王，參照不同規範，仁而取舍異，則取舍與時行不外，不與時行者為不

Hannibal, Illinois

Southern California
CALIF. PANEL & VENEER CO.
953 S. Alameda Street
Los Angeles

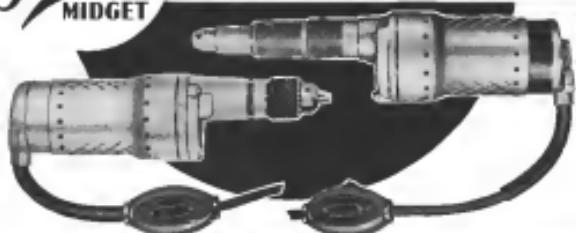
Exclusive Sales Representatives
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Northern California
H. B. MARSH PANEL CO.,
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San Francisco.

TRAVEL BY AIR... FLY YOUR MAIL AND EXPRESS

the Smallest Electric Tools Made

Thor
MIDGET
ELECTRIC DRILLS
and SCREW DRIVERS



Exceptionally Light In Weight and Speedy

These small electric drills and screw drivers were especially designed for fast, delicate work. Since their introduction, they have rapidly taken the place of small hand operated tools because of their practicality and the many different kinds of work they can be used on.

They fit into the palm of the hand, and being light, are very easily handled. Ideal for Aeroplane, Automobile, Radio, Furniture, Machinery and Electric Appliance manufacturers.

The drills are made in two sizes— $\frac{3}{8}$ and $\frac{1}{4}$ in. capacity. Weight is $1\frac{1}{2}$ lbs. Length overall is $9\frac{1}{4}$ in.

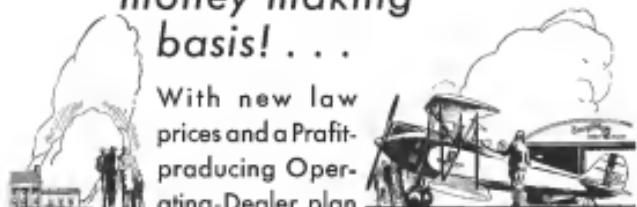
The screw drivers are made in three types: one at 1250 R.P.M. for No. 8-32 metal screws; one at 950 R.P.M. for No. 10-24 metal screws; and one at 485 R.P.M. for No. 8 Wood Screws. Weight is 3 lbs. Length overall is $11\frac{1}{4}$ in.

You can try one of these small tools in your own shop for ten days free of charge. Put it to the test. If its performance doesn't satisfy, return it at our expense. No red tape.

INDEPENDENT PNEUMATIC TOOL CO.
New York TOOLMAKERS
PNEUMATIC TOOLS—ELECTRIC
Thor TOOLS—AIR COMPRESSORS
SINCE 1893 London
232 So. Jefferson St.
Chicago, Illinois

We're putting
Aviation on a
money making
basis! . . .

With new low
prices and a Profit-
producing Oper-
ating-Dealer plan



GREAT LAKES pioneered the movement to put flying within reach of every-one by lowering the price of its improved 1930 model Sport-Trainer from \$4990.00 to \$3150.00. Now Great Lakes goes even further with a new Operating-Dealer plan that puts Commercial Flying on the same established, profitable basis as any other business.

Great Lakes Operating-Dealers are leaders in Commercial Aviation in their localities. They are keen business men as well as experienced fliers. They operate the leading Flying schools, their repair hangars are headquarters to all visiting pilots for maintenance; their other flying activities are varied and profitable. And they lead in ship sales, too... for Great Lakes' outstanding performance, smart appearance

and amazing low price... \$3150... makes it the unquestioned favorite of the air-minded public everywhere.

We'll show you how to get into the money end of flying. We'll show you how we have helped others to organize, to finance, to service, to operate on a profit-making plan that is workable all year round. A great national advertising campaign helps you build your business.

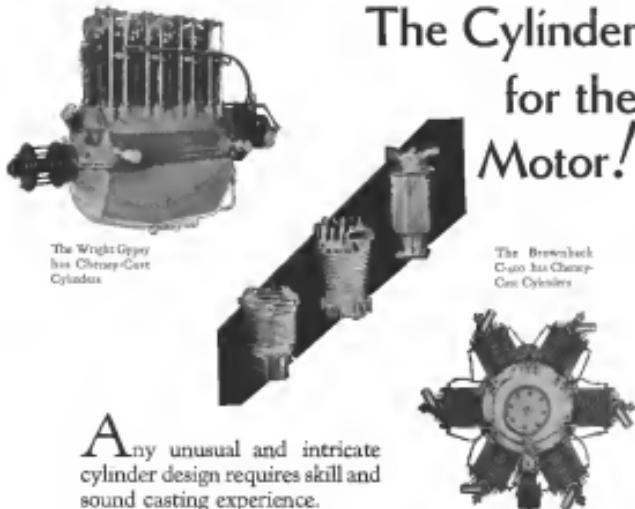
If you would like to establish yourself permanently and profitably in your community with a Great Lakes franchise, write us details of your present operations and a resume of flying activities in your city. . . . Great Lakes Aircraft Corporation, 16950 St. Clair Avenue, Cleveland, Ohio.

Manufactured under U.S. Department of Commerce Approved Type Certificate Number 228

GREAT LAKES
CORPORATION
Contractors to the United States



AIRCRAFT
CLEVELAND
Army and Navy



The Wright Gypsy
has Cheney-Cast
Cylinders

The Brownbeck
Case has Cheney-
Cast Cylinders

Any unusual and intricate cylinder design requires skill and sound casting experience.

Our past record in the casting of cylinders for motorcycle and automobile engines, stationary engines, and air-cooled motors for aviation allows us, to-day, to claim greater experience in casting methods and metallurgical research.

We can furnish castings in the rough, or machined cylinders ready for assembly, direct from your blue prints.

Our twenty-five years' experience in casting air-cooled cylinders is available to any responsible motor manufacturer.

S. CHENEY & SON
Manlius, N. Y.

CHENEY ~ CAST ~ CYLINDERS
High Strength ~ Low Cost

1,000,000 MILES . . . STOUT AIR LINES!



The Ford Plane

The Ford plane has proved its dependability in flight by carrying 1,000,000 miles of travel. It has a long range, is reliable, and has a high rate of speed. It is the first plane to have a long range of from 1,000 to 1,500 miles on a single tank of gasoline.

The range of these planes is 15 to 20 passengers and a crew of two men and a pilot. They are built of all steel, which makes them extremely strong, durable, light, and economical.

The price of the Ford trimotor, one of the most reliable and popular planes in the country, is \$15,000. It is built to last for many years.

Ford airplanes will be glad to give you information concerning the Ford trimotor, its features, and its cost.

An airplane service Ford plane for 15 to 20 passengers and a crew of two men and a pilot, weighing 1,500 pounds.



Also noteworthy is the achievement of Stout Air Lines, operating the Detroit-Chicago-Cleveland route. Up to the end of 1929, well over a hundred thousand passengers had been carried, eight hundred and forty thousand miles without the slightest injury to a passenger, and with an extraordinarily record both for reliability and the percentage of scheduled trips completed! Ford aircraft, tri-motorized transports only are used on these lines.

The first operating route of Stout Air Lines was between Detroit and Grand Rapids, beginning in August, 1928. Since then new lines have been opened . . . , schedules extended . . . rates cut almost in half!

Four round trips a day are flown between Detroit, Toledo and Cleveland. One way fare is \$3. Two round trips daily are flown between Chicago and Detroit, one way fare being \$3. On this route stops are made at Battle Creek, Kalamazoo and South Bend. The demand for passage on these lines is so great that on one occasion, at Jesup, it was necessary to run eleven sections.

Ford planes are used on these lines with the steady dependability of trains and buses. They are recognized by every one as a permanent form of swift transportation.

FORD MOTOR COMPANY

Visitors are always welcome at the Ford airport at Detroit

All classes except transportation by Ford planes with the same equipment that they accept rail transportation.

AIRPORT LIGHTING



In order to put flying on a 24 hour basis airports must be adequately illuminated to make the sport and art of flying safe as it is in the daytime. For that lighting only the best and most reliable equipment should be used.

Crouse-Hinds Company manufactures a complete line of dependable, and efficient airport lighting equipment.

Airport Catalog No. 312 will be sent upon request.



Type DCE84

CROUSE-HINDS

Established 1886
SYRACUSE, N. Y., U. S. A.



WITHOUT REBOUND GRÜSS



WHO CUSHIONS YOUR CUSTOMER?

On a surprising number of airplanes our Grass equipped, there are two kinds of rebound! The first is a rebounding away and joggle from uneven ground or rugged landings. The second, a by-product of the first, is the rebound from your customer that will surely follow.

It is only a matter of landings until your customer becomes jump-conscious and Grass-wise! Grass struts, streamlined in our factory, are shipped to you complete with fittings ready for instant installation in your plane. Grass costs no more. Grass struts are lighter and require less service, and above all else, Grass insures smooth landings without rebound.

Why wait until your customer rebounds, disatisfied, before you too become Grass-wise? Now is the time to eliminate plane and customer rebound and lessen sales resistance! Change to Grass!



Grass struts are demanded by the manufacturers of America's largest land planes. Grass also manufactures a complete line of hydraulic shock absorbers which includes a hydraulic retractile gear. Write for details.

**GRÜSS AIR SPRING COMPANY
OF AMERICA, LTD.**

4336 District Blvd., Central Mfg. District
Los Angeles, California

THE NEW LEBLOND "66"

*with exclusive LeBlond unit assembly
new power.. light weight.. low upkeep*



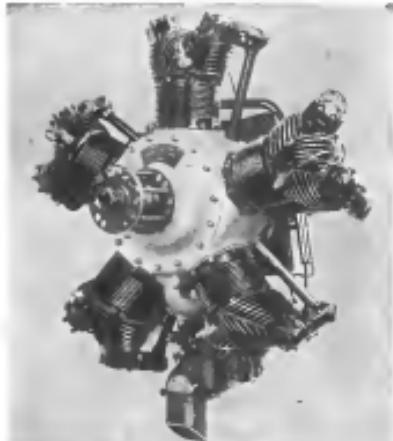
The first thing to be said of the new LeBlond "66" is that it possesses an exclusive LeBlond unit assembly, first introduced with the LeBlond types "60" and "66" Hispano.

Ask any mechanic of LeBlond unit assembly -- how easy it is to inspect a certain part, -- or to remove gear case assembly, or crank shaft assembly for inspection, without tearing down the whole engine. He will tell you of these and other vital features of LeBlond unit assembly which provide for rapid speed, ease, and economy of servicing.

The new LeBlond "66" is especially adapted to high performance, two and three-blade airs. Cylinders are of steel and aluminum construction effecting a considerable saving in engine weight. Horse power has been increased and the engine speed raised to give a much higher rating than in the "60".

Specifications

All Models	"60"	"66"
Type	Engines	Engines
Rating	11 H.P. at 1100 R.P.M.	14 H.P. at 1100 R.P.M.
Stroke	2.50 in.	2.50 in.
Total Displacement	291 cu. in.	341 cu. in.
Compressor Ratio	2.4 : 1	2.4 : 1
Overall Length	46 in.	46 in.
Overall Height	22 in.	22 in.
Weight (less Fuel)	224 lbs.	224 lbs.



Approved by the Department of Commerce

An exclusive LeBlond feature is the anti-friction rocker box assembly with sleeve for positioning fulcrum of rocker arm with respect to valve stem. With sleeve adjustment whenever valves are ground, there is an absolute minimum of wear in the valve guide bearing. The high-efficiency-cooling "peripheral" cylinder head, originated by LeBlond engineers in the LeBlond "60," is now further refined and improved in the "66".

Stark, powerful, racy, dependable -- just demonstrate the LeBlond "66" and know for yourself the substantiation of high performance of its best. The LeBlond Aircraft Engine Corporation, Cincinnati, U. S. A.

LE BLOND
AIRCRAFT ENGINES

These Men
are Responsible for your Training
at America's Largest and Finest Air College



Oliver E. Parks, Vice President and General Manager of Parks Air College, a member of the U. S. Aircraft Division of Detroit Aircraft Corporation, and former Latin American Director. Mr. Parks has been a leader in the field of aviation education and has conducted many advanced courses at Parks and stages are particularly interested in his work.



Edward S. Evans, President and Captain, Detroit Aircraft Corporation and Director, Sales Division, Detroit Aircraft Corporation, and Chairman of the Board of Directors. President Evans also holds Company Directorships in the Detroit Aircraft Corporation, Detroit Aircraft Corporation, and the Detroit Aircraft Corporation.



James West, General Manager, Detroit Aircraft Corporation, the third Parks Air College graduate to become a university faculty chief instructor. Major Alexander, himself, taught James West at Parks Air College, and James West has since taught many advanced courses at Parks Air College.

aspire to a private, liaison commercial or transport

pilot's license? Come to Parks--here you will find a large staff of the most capable instructors, a great fleet of over 30 training ships of many types, and the most thorough and complete instruction courses imaginable. Come to Parks if you want to become an airplane and engine mechanic--we give you the same quality of instruction as our pilot students receive. All courses are under Mr. Parks' personal supervision. His policies combine but the best and most modern methods of training for every student.

Whatever you know, it will pay you to come to Parks for your training. Don't hesitate with your fears. Your best chance of success lies in entrusting your training to this great, time-tested institution. Send coupon for details.

Parks Air College was one of the first to be licensed by the U. S. Department of Commerce as a fully accredited transport school

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DIVISION OF DETROIT AIRCRAFT CORPORATION
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ST. LOUIS MISSOURI

COUPON	
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Without cost or obligation to me, please send your illustrated catalog.	
Name	
Street address	
City	
Occupation	
I am interested in Parks <input type="checkbox"/> Mechanical <input type="checkbox"/> Mechanical's Course <input type="checkbox"/>	



Brunner Deployed Winkler Shop, Gorham Flyer Service Bureau, Buffalo, N. Y.

BRUNNER EQUIPMENT KEEPS THEM IN CONDITION

Compressed air plays an important part in the construction and servicing of aircraft. It saves time and insures better results on each important job as engine cleaning, operating pneumatic drills and hammers, tire inflation, greasing, dusting, blowing carbon, testing valves, clearing shaps, parts, etc. For the application of lacquer, special aircraft finishes and wing dope, it provides by far the most efficient method.

Brunner Equipment is built to furnish the dependable service which the aircraft industry demands. Models 854 and 868 are recommended for general hangar service. Special spray painting outfits complete with all necessary accessories are also available. Brunner engineers will cooperate in working out your equipment problems. Catalog No. 15 lists the complete Brunner line including spray guns, engine cleaners, blow guns, etc.

Brunner Equipment is sold by aeronautical and automotive dealers. It is backed by the oldest and largest manufacturer of automotive air compressors in the world.

AIRCRAFT DIVISION

BRUNNER MFG. CO.
UTICA, N. Y.



MODEL 854
Completely Assembled
With Pump, Filter, Air
Washers



BRUNNER — AIR —
COMPRESSORS
A WORLD'S STANDARD OF DEPENDABILITY

NEW-YORK-AIRCRAFT-SALON MAY

EIGHT
EVENTFUL
DAYS

3
4
5
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7
8
9
10

MADISON
SQUARE
GARDEN

Staged in the Show Place of the Show World—
Madison Square Garden—the New York Aircraft
Salon reaches the heart of America's richest market,
in the greatest selling month of the year.

The show will open a series of brilliant aeronautical
activities in the New York area, with the eyes of the
world focused upon the triumphant return of Admiral
Richard E. Byrd and the twentieth anniversary of the
epochal flight down the Hudson from Albany to
New York.

MAKE YOUR PLANS NOW!

Make certain that your organization will be represented in the great aeronautical merchandising event,
and arrange to attend the show yourself. Write today
for a complete program of the eight eventful days at
the New York Aircraft Salon.



Sponsored by

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**AERONAUTICAL CHAMBER
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10 EAST 40th ST. NEW YORK

LEADING THE NATION INTO FLIGHT . . .



Announcing **2 NEW**
HAMILTON STANDARD PROPELLERS
 for 60 to 115 h.p. engines



This "Sport Junior,"
is a new three-bladed
propeller. It weighs
only 17 pounds.
It has a maximum
diameter of 5 feet 6 inches.

This "Sport Senior,"
is a new three-bladed
propeller. It weighs
only 21 pounds.
It has a maximum
diameter of 5 feet 6 inches.

Two important additions have just been made to the Hamilton Standard line of metal propellers.

The "Sport Junior," designed for engines ranging from 60 to 90 h.p., and the "Sport Senior," for engines developing from 90 to 115 h.p. Thanks to quantity production, prices on these new models are very moderate.

Hamilton Standard light alloy propellers have demonstrated a decided superiority in efficiency over those made of other materials. A simple calculation, based on the cost per horsepower of an aircraft engine, will show how this improvement in performance is enough to justify the cost of the light alloy propeller. Another simple calculation, based on the cost of fuel, will show that the economy resulting in a relatively short time, from the superior efficiency of Hamilton Standard Propellers, will also justify the cost of the light alloy propellers. Hamilton Standard Propellers will outlive many sets of propellers made of other materials. That factor itself

will lower the cost of the Hamilton Standard Propeller.

Any one of these three striking economic advantages is enough to dictate the use of light alloy propellers. All three of them are contained in Hamilton Standard Propellers. In addition, the fact that when the propeller disengages when Hamilton Standard Propellers are used, and that damage to blades can be readily repaired, are important potential advantages. It is for these reasons that Hamilton Standard Propellers are so widely used in the commercial and military fields at home and abroad.

The addition of these two light-weight, low-priced propellers to the Hamilton Standard line makes these advantages available to the pilots of Sport Planes. The "Sport Senior," at about 21 pounds, and the "Sport Junior," at about 17 pounds, are available for prompt delivery. Correspondence is invited bearing upon these new models, and upon any other question or problem concerning aeronautical propellers.

HAMILTON STANDARD PROPELLER CORPORATION
PITTSBURGH **PENNSYLVANIA**



DIVISION OF UNITED AIRCRAFT
AND TRANSPORT CORPORATION

Voltage Regulation

developed by
LEECE - NEVILLE
Applied to

Engine Driven Generators For Airplanes

TYPE	VOLTS	AMPÈRES	R.P.M.
B-1	12	25	2000-3000
C-1	15	30	2000-3000
G-1	15	15	2250-4000
D-1	15	25	2250-4000
E-3	15	50	2250-4000

On Display at

ALL AMERICAN AIRCRAFT SHOW
 April 5-13th **MUNICIPAL AIRPORT** **Detroit**

Manufactured by
The Leece-Neville Company, Cleveland, Ohio

STROMBERG CARBUREATORS

are used as standard equipment

... by ...

Air Craft Engine Corp.
Allison Engineering Co.
American Motors Corp.
Aero-Union Inc.
Cessna Engine Corp.
Continental Motors Corp.
Cummins & Cessna Co.
Friedell-Krebs Corp.
Kinner Airplane & Motor Corp.
Lindbergh Aircraft Co.
Macchi-Yates Corp.
Le Rhône Aircraft Engine Co.
Light Metal and Foundry Co.
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Potez Aeroplane Mfg.
O. K. Society Corp.
War Dept. Supply Corps.
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Wright Aero Corp.

STROMBERG

growing with aviation

Years ago when aviation was in the experimental stage Stromberg was experimenting, too, with an aircraft carburetor. One that would be dependable, light. That would supply the proper fuel mixture to the engine at all speeds, in all positions—efficiently and economically.

Such a carburetor was developed. The difficulties of propeller blast and upside down flying were overcome. A dependable, durable, economical carburetor was designed and built.

The aviation world quickly recognized the remarkably fine performance of Stromberg carburetors. With the result that over 90% of American aircraft flying today is Stromberg equipped. And as aviation grows, and new planes and new engines are developed—inevitably builders turn to Stromberg for the solution of their carbureting problems.

STROMBERG MOTOR DEVICES COMPANY
(Division of Bausch Aviation Corporation)

55-62 East Twenty-fifth Street

Chicago, Illinois



THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

1500 15¢-A-1 EDITIONS
ESTABLISHED 1914

EDWARD P. MARSHAL, Editor

VOLUME 12 • April 5, 1930 • No. 14



Detroit . . . and Salesmanship

IN THE HOLDING of aircraft shows there are two distinct purposes, and when two shows of first rank importance are scheduled but a few weeks and a few hundred miles apart they naturally suffice diverse aspects. A display of aircraft reveals the state attained in the art of design, and offers the engineers of the industry the opportunity of making concentrated revelations of the latest fruits of their dreams. Of more immediate importance to the stockholder, however, if not of greater fascination for the student of aeronautical science, is the commercial function of the display. An aircraft show is a show in the restricted sense of the term, but it is also a market-place. It takes the measure of public interest and of prospective public demand for the products served upon the floor.

Most of the essential meetings of 1930 were offered to the public gaze in February, although some of smaller magnitude have been held back for their first display at the current show. The unusual significance of the Detroit gathering is not, however, primarily in the consequences that it will entail, but in the opportunity that it offers the field for presentation, for gauging the sales prospects of 1930. We have accepted the necessity of holding a new public, and making them in a new spirit. The past few weeks have given some clues to be gathered up and interpreted when the distributors and manufacturers come together at Detroit in the quest in which our new potential customers are going to meet us.

This week's show is ideally planned for the purpose. It covers when the season of summer activity in the northern states has continued just long enough to provide an index of the extent and the nature of the interests existing among possible retail customers. It comes in a city recognized as one of the leaders in public enthusiasm for aviation and all its works. It comes under all its pre-requisites in a building ingeniously converted with a

flying field, and it is but a few steps from the exhibition on the floor to the demonstration of the same machines in the air. That may be a dismal blow to the tennis houses, but it is a welcome innovation from the point of view of the already interested dealers, operators and would-be private purchasers who will be on hand.

The proximity of the flying field, and the prospect that it will be used to somewhere near the limit of its capacity, create a very grave problem of traffic regulation. The management have prepared an exceptionally complete set of flying rules. As the minimum condition of safety, they must be adhered to. They should be enforced with merciless rigor if necessary, but no enforcement ought to be called for. Ordinary good sense on the part of the pilots should insure the most careful and orderly conduct of aircrafts of every kind and no regulation.

Detroit's offering should be more a test and a demonstration of interest than a "show." Neither at Detroit nor anywhere else, however, will appear solid salesmen. Merchandising is as low as art does or production, and the modesty of aircraft manufacturers looks best from the experience painlessly and slowly accumulated in his own field and from the presidents of other related industries.

Because of the intimate relationship between the Detroit Exhibitors and the profits of selling, we have devoted much attention in this issue of *AVIATION* to a survey of the merchandising side of the industry as it stands today. The topic is one that must be of interest to all if the industry is to progress in public favor. No one concerned with the commercial art, from the worker in a wind tunnel to the pilot on an air line, can be indifferent to the subject of selling. The future for all of us hangs upon the success with which the problems of principle and technique here discussed are solved in practice.

And Now LET'S GET DOWN TO Work



William B. Stout, self portrait.

► The airplane business is still in the hands of the engineers.

► This article is intended to stir up the engineers.

► It probably will not fit in with the ideas of others and most manufacturers will not agree with me.

► These short books tell me that it can't be done.

► The pilots tell us the last to see it.

► The idea do not conform to a business way to helping about present necessities.

► They cannot understand research and the spending of money before we come to the solution.

► Money is about all that we have in aviation at first.

► Let's forget the money for a while. Let the investment holder relax in Palm Beach with his yachts and let us—forgetful for his dependence get down to solving airplane problems instead of allowing the banking business to bother us.

► Money never created anything yet!

► What we need now is to look around for some brains.

► Forget what has been said what is. Let's analyze what must be before we have a real aviation business. They let's do it, and Behold—Aviation!

By WILLIAM B. STOUT
*President, Stout Air Lines Consulting Engineers
Airplane Division, Ford Motor Company*

ILLUSTRATIONS BY THE AUTHOR

RECENTLY some seven hundred millions of dollars have been poured into aviation. Plane factories as every hand are attempting to get into production on this type or that. Schools here and everywhere are striving to graduate pilots as prepared for coming production. Aviation publicity and the public belief in flying has gone forward with great strides and everything concerned with aviation has been booming.

But, the future of aircraft industry is still the responsibility of the engineer. Money alone never did and never will create anything. There is no use of going into production in quantities on a thing which the public does not want.

There is small room for building a lot of planes with the market limited to those few who now have how to fly. Flying is too expensive to leave to attract the general public as yet. A lot of things must be done in the airplane before the private-owner industry is here and these things are up to the engineer to solve and not to the banker or the salesman or the production manager.

No one, at yet, has built the private-owner plane, and by that I mean a plane that will fit the public—not just the pilot market.

The public is "The man on the street" who believes in invention, who wants an airplane for his own use, whose finances and intelligence are average and who is just as ambitious as the millionaire. It is just as foolish to say that the plane will be only for the man of wealth, as it was when the Dodge Brothers made that statement to Henry Ford about automobiles. The automobile has created enough wealth so that now the public can enjoy motor transportation. Aviation will produce more wealth, but, nevertheless, present-day planes won't fit present-day economies.

This man on the street is not weird in aviation except that he has a "bug" to fly.

He wants glibly such things as a pocket, fast, safe, air-conditioned without really knowing what they mean, if they really mean anything. At this man's request, he would prefer to go to a noisy as所能的 six seats, he would spend \$5,000 or even \$10,000 to learn how to fly. He will expect to go to a factory on a Friday afternoon and by his plane back home the following Monday morning. You may laugh at my statement, if you will, you in the industry, but you do this and build a plane that is safe enough for him to fly home in, you will not have

the industry for which you are looking. We can eventually make a plane fast-enough so that a man can sail in 5 hours and fly home in 10, with the Department of Commerce's entire sanction. As we engineers meet our obligation, we can rest assured that the Government will remove any restrictions to advancement.

THREE DANGER of our present situation is too much money. This money is looking for dividends rather than progress, whereas the industry is looking for progress. The money wants production and sales. The industry wants better airplanes, organs, instruments, etc. Thomas with too much money will make his experiments on too large a scale, a man with only \$10,000 to work with will experiment as cheaply as he can to conserve as much as he can and his mistakes will be small. The man with a million will make just as many mistakes but his will be on a larger scale. For this reason, the big firms can do less although their analysis would seem otherwise. We can take it for granted that the new things in the industry will come from small experiments rather than from large ones, from engineers rather than from the public masses. So, the small experimenter is in a hunch. Let me take heart as having more chance of solving this than does the millionaire in a million-dollar laboratory. The new industry coming includes not only airplane and engine design and building, but sales, serving, publicity, advertising, expert, operation and whatever. We all have wondered what will be the first step and how the thing

can be carried on, but we have made small analysis of the problems.

To date, we have noticed the original Wright airplane by better engines and better aerodynamics and higher factors of safety, but we have not changed the materials nor the fundamentals. We have built no airplanes since the Wright as efficient per horsepower as was the Wright biplane. We are still building kites as kites are cheaper to build. We build square wings with ribs. We build fuselages and cover them with cloth for the same reason. Isn't it time we realized that at this stage of development, the great cost is not production, but sales? It is much cheaper to add a thousand dollars to the first cost of an airplane if you can save a thousand dollars in sales revenue. For you build up your volume so much quicker. There is only one way to market an airplane cheap and that is by not building a cheap airplane. We must first solve the problem of the plane and then make this good airplane cheaply by quantity of production. There is no excuse for not spending three years trying to make a cheap airplane have been and will be disappointed in sales, for the public does not want merely a cheap airplane. It wants the safest possible engine at a cheap price.

In the new airplane design therefore, sales is the first step to have in mind, even ahead of performance itself.

At the present time every member of the aircraft industry is seeking a solution to the problem of . . . What should we do, and how are we going to do it? If all expressions of opinion regarding that problem were placed end to end they would reach from here to there and back again. This article contains the opinions

of Mr. Stout, who, of course, needs no introduction to our readers. Whatever Mr. Stout writes is always worth reading, and digesting thoroughly. His views should prove of particular interest to engineers and manufacturers and other members of the aircraft industry who are struggling with the same problem.



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The general public has an idea from cheap-motor car methods that sales is leading the public somewhere, that it does not go understanding brains behind and guiding what we have. We are giving away the product free or injury induces us in shorter jobs to get rid of problems. It is history, however, that the great production of goods is of the best goods which sales resistance is cut down by obvious quality—quality of material of workmanship, quality of performance and is most basic, primarily, of appearance. In airplane work, we cannot force on to the public something that it does not want. We can not send a high pressure salvo from the public's back door to show a machine hits the bodies while the assault rings the front door bell to get the idea-of-the-house out on the way until the machine is delivered. These theories have worked in the past with crooked methods of shock predators, but those days are over and would not fit our problem anymore.

Firms that have tried the cheap motor car method of sales and distribution of airplanes with poor numbers of dealers and weak conservatism and indecisiveness have left this type of planes sales suffering from it. Airplanes are a new product and advertising peer is required to move them. The world itself won't visualize something new or the prospect will not be convinced.

Now, let's be fundamental! When you read an advertisement the eye translates the sense of the reading to the ear which translates the sense or nonsense of that ad, and reads it back again as a visualized picture to the eye nerve which carries the picture direct to the brain. Talk or printed word, therefore, has to be translated is isn't lead, and therefore loses force and authority. If the eye can be immediately sold on a product without recourse to word or printed page, the mental reflexive is removed and fail.

We have already developed in civilization, what I have called "The Science of Eye-Appeal." This term is used because the ordinary word, to stimulate the sense pictures to see only paintings on the wall of a museum or exhibit, or decorations in a millionaire's house—lead-sashes, curtains, books of from, etc.—isn't to reflect the on-looker and with no other object in view. What I am trying to visualize in this same article applies to putting "Eye-Appeal" into our product. This science is ordinarily known as "Art."

The rules of arrangement of line, color, form, composition, perspective, texture, tone colors, are just as definite in the art of mathematics as engineers so probably all of the rest of a slide rule. There is more grace involved in the mathematical branch of our engineering. If we want to build a theater, we build our art around neatest lists of set arrangements and dimensions, light location, pitch of floor, width and height of stage, color of lighting, location of spotlight, scenery colorings and the like. We aim to give the customer at the theater the greatest comfort possible both of body and eye and all of his mind can be concentrated on the play.

Dusties are private, decorative, enclosed, overhead (color we call ceiling-cut art) for the reason that man does not have to live in this theater environment and he does, therefore, stand a great deal of decoration for no hour without being tired.

If we want to build a building for different psychological effect, we can arrange our art in lines form, color to fit almost any requirement. If we want to make a man feel uplifted and "Springy" we give him a lot of high ventilation in the building, short distance, comfortable seats and a stage at the side instead of the center so that his back will be twisted and a rise reflexes to his legs.

Now we cannot be miles away of this instance which was well developed in other sales lines and apply some of its principles or making our product look like something the public wants to buy.

The hardest thing to design into any airplane is that feature which makes a person stand in front of the product and say, "I want that." This eye-appeal is what makes an airplane cost \$5,000. When the one next to it at another manufacturer and the same amount of wood can be purchased for \$10. Let's get a little of the same spent into one airplane because if you ever see an airplane that has this appearance grab on to it, and develop with it, even though the interior may be Swiss cheese and tin lead. We know enough about the engineering to know that we can get that into the design, too, we have thoroughly analyzed to date the attempt to hold something to sell the eye.

Once the eye is sold, however, we must see to it that the product is demonstrated more than looks up to its appearance. If we are going to get this new public, we also have our performance built in—velocity, speed, climb-off, landing and take-off times. It cannot just be another Jerry or Joe, another military design.

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In THE FIRST instance of safety it needs no argument that structure will be strong. No matter how good an airplane may be aerodynamically, if the wings come off when it goes up into the air, it is not an airplane. Strength even stronger than our present Department of Commerce safety requirements were to build safe planes in order to keep down the cost of maintenance.

After this basic necessity of structure comes vision. Vision in precision-type planes to change a course of real trouble to a man on his first flight he cannot understand why planes "waddle" and the engine propels itself either otherwise directly in front of the pilot, merely dissipating energy from the field of visibility. If one had to drive a automobile by watching the side of the road, he would quickly change the design.

Many disagree with us on the importance of this, but as airplanes get more and more into the air in numbers, man will become more and more of basic importance. It will be necessary, also, that this vision be standard for all planes. One of the greatest dangers now of flying around airports is of collisions, where one plane can see up and not down, whereas the other plane can see down and not up. The plane below is likely to climb into the plane above without seeing it, as the plane above is likely to land on the plane below without seeing it. It is my belief that a direct forward vision will soon be a requirement of the public on all surfaces, the same type of vision that they now have in an automobile or glider. One can take a glider, where the pilot sits out in front, with nothing ahead of him, costs off a hill and make a respectable landing the first time he ever tries. The vision is what he is accustomed to and as he approaches the ground he naturally pulls back on the stick at the proper time. If we could eliminate the present engine and propeller in front of the pilot, giving him clear vision at a distance from the ground to which he is accustomed in an automobile, it is my belief we could get at least two

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hours from the training period of the average student pilot on landing. As soon as the air gets full of planes this vision will be necessary.

The next thing which safety demands is controllability. This is easily different from mere stability. This has been pointed out at the difference between a bicycle and a tricycle. The tricycle is stable, but will not go where you want to steer it unless the ground is level. The bicycle has controllability and once in motion you can make it go wherever you want, safe hill or not. It is perfectly easy to make a stable airplane, as we know, but it would follow every gust of wind. What we want is a plane which will sit down where we sit it down, whether the wind be from the side or any other direction.

Another item of controllability is, in a stall. Coming into land is a critical moment in aviation. If one is investigating his field through manipulation or otherwise, the pilot either must sit still or still the plane in. The latter is the better and safer way provided the wing curve is such that the lift does not hold out suddenly as in the side-winged European and American Military types. The drag curve of lift should show a flat spot at from 16 deg. to 20 deg. or the equivalent, so that there is a wide angle of attack available in the air at a stall and particularly in the student pilot, to take care of faulty judgment and lack of experience. This gives him a greater period of time to get the feel of the plane as it comes in. When he levels out for a landing he should know that support will not suddenly leave him and that when he stalls in he still has enough controllability in the ailerons to keep from getting into a spin, no matter what gust of wind, or unexpected happening



Fig. 1. Basic arrangement of aero parts in weight order.

any worse. This type of wing curve should save another 10% in the length of time before solo for the average student, where one is reaching his only to fly this particular machine, as in the case of a prospect, or customer.

Now, if we can fit to this machine a super-landing gear capable of taking shocks equivalent to a flat spin landing, we can still further reduce this student time. Very recently with a new type landing gear and Messier's trim, we passed a 10-second test from 25 ft. to an angle of about 45 deg. with no nose shock to the plane that was a rough landing with the old type wheel and gear. With such a fitness a student could safely come in and land properly landing out there or four feet from the ground and land fast to get accuracy enough to hit harder and faster. As soon as we can make proper landings from normal height, we can solve without danger.

It is my opinion that safety also demands closed cabin, if we are to do all year around flying. Like David, no

man is at his best in a forlosed flying suit, helmet, mittens, goggles, goggles, etc. Not only can he be better to the other, but the cabin itself and a proper helmet will weight less and allow better performance than the weight of the flying suit etc.

Now we come to what the public will demand and insist. Whether they like it or not appearance is the first item. They will insist on it and look safe to them, they would rather sacrifice who will it and first. This appearance, so far has turned out the popular type plane though the extra efficiency is admitted. It is hardly possible that the out-rigged type of plane will impress the purchaser as a personal type. If we can make it first place, allowing a trailing, appearance might be bad.

NEVERAL times the public wants comfort; this means fully closed cabins. The public does not mind transporting passengers carrying two or more than it would be a two-seated automobile look the same way. If a young man is flying out with a young lady he does not want her sitting *airly* in a back rib where he cannot talk, or cannot see out the things of interest along the way and is absolutely denied of any sociability on the trip. The public will demand side-by-side seating with some provision arranged, however, so that the passenger for an emergency cannot grab the rim of the pilot and be a sympathetic cause of disaster.

Possibly last is the last which the public will demand is relaxation for safety. I would use the word safety, as yet the public does not seem interested in safety because of the large number of cars, but last, does the engineer, but a place where there is good relaxation in the seats, distance can be maintained so that the public will have a basis of real belief in other sources.

Possibly we come to this, third, that performance demands. First, is light weight in both plane and the engine. I agree in this light weight per square foot of wing and light weight per horsepower of engine. For this private owner plane with our present performance, we should have at least 50 hp per passenger and for a private-owner plane a wing load of not over 10 lb per sq ft.

Second to light weight comes low resistance or minimum parasite resistance. The private owner plane of the very rare future will of necessity have to have a crating speed of at least 100 mph. If we give this plane the smooth contours necessary for high speed, fold up the landing gear, reduce the engine size, then we have made a "boat" which may very nicely get a beginner into difficulties in overhauling his landing gear. There should be arranged, therefore, for such a type of plane some kind of parasite resistance to be extended from the plane to kill the lift/drag ratio and help him to stall in from steep angles over trees in small spaces.

Finally the three fundamental that I want to leave particularly as affecting sales at the present time are:

First: Appearance—We are not giving the public what it wants in design.

Second: Cost—We have been trying to build cheap planes instead of striving to make the best possible plane.

Third: Performance—Such as to cut out the major risks and time requirements of the student pilot, before the purchaser can fly his own plane home.

WHERE IS MY *Wandering* *Market TODAY?*



A well-known private plane owner
Mrs. Maxfield and Mr. Truett All

SPEAKING GENERALLY, the American aeronautical industry is divided into two classes of members—the operators and the passengers. However, because these two extremes is another group, composed of people who are keeping their eyes on the ball and are neither operators nor passengers regarding the results of their efforts. It is that group, and the ones who fall in line with them, that our children's children will have to thank for placing aeronautics on a profit basis.

When Lindbergh went to Paris the aircraft industry in this country became a group of racing aeronauts. And thus in the course of the next three years the Order of Aeronautical Passengers and Kill Joys was inaugurated. The sharp end of 1929 sent many of them down out of control, and today they go to shows and other aero banquets with faces a little red, and nothing but bad words for the future. The ones who retain their membership in the Society of Aeronautical Engineers and Hot-Air Artists are still taving as of years. It can drag the forces of history, then because they fear that the public will drop its interest in aviation entirely.

The third group, which ought to be termed the Hard-Bodied Level Headed Aero Business League, is neither long of face nor money. It is rolling up its sleeves, indefinitely and irrevocably, and endeavoring to apply intelligent effort to the task of making money.

And that is just why we are all in aeronautics—^{to make money. We may be in it because it's our first love . . . we may be in it because it's an attractive hobby . . . or we may be in it because of necessity. But everyone of us is in it to make money, if we can. And so, the aeronauts talk in terms of millions and work in terms of nickel and dime; the passengers groan only in terms of bills and red ink; and the hard-bodied, level headed ones think and work in terms of future progress.}

The problem, then, is what is to be done, and how should it be done. For the sake of clarity and controversy

let us regard the situation as the Hard Bodied Level Headed Aero Business League acidulously views it:

We have developed a new and wonderful means of transportation. Regardless of all other competitors that might be made, it is at least the fastest mode of commercial or passenger transportation in the world today. In our opinion it is safe, it is efficient, and it is adaptable to the daily life of the man in the street. That man in the street, however, does not agree with all of our views. He regards the performance of the airplane. He appraises its capability. But he and other members of the majority of men in the street do not consider it necessary to their daily life in either a business or pleasure way.

Why? that is the problem the question that must be answered satisfactorily.

It is price? Some say yes, others say no. Airlines have charged rates to a point where they equal railroad rates, and traffic has increased enormously. Perhaps it is price, after all. Yet on the other hand, some office operators report that even with reduced rates only about fifteen percent of traffic is repeat business.

Some manufacturers have cut prices on their products. Cut them below any chance of profit in the present market. They believe that quantity sales will make up the difference eventually. Perhaps so . . . but when? And what about the time in between?

We often hear the argument between the price of airplanes and the price of automobiles. And we wish emphasis upon the fact that airplane prices are considerably more. Is there any logical reason why they should be less? To me the purchaser getting more for his money in both quality workmanship and performance? When the man in the street changes from the horse and buggy to the auto car he paid more as initial cost, and he paid more for maintenance. In the airplane he secures an even better method of transportation for pleasure or business. Why then should he expect to pay less?

Naturally it follows that quantity production and sales will reduce manufacturing costs so that P.O.D. price will be also reduced. But why insist that the price should be at least equal to, if not less than, the price of the method of transportation that supersedes the Old Grey Goose? Certainly there is a difference in price between a rowboat and a motor boat, and another department of that industry is suffering because the public does not appreciate the difference in product utility for money invested.

Therefore, it would soon only logical to impress those facts upon the airplane prospect. Convince him of the superior workmanship, convince him of the superior per-



By R. SIDNEY BOWEN, Jr.,
Assistant Editor of AVIATION

formance and convince him of the increased value and utility for money invested.

All of which sounds very nice until one asks the question . . . who is the prospect, and where is he?

If we knew, we would gladly send name, address and telephone number to all reputable aircraft manufacturers. That however, is the task that lies ahead. The point at issue though, is that although quantity production and sales will reduce prices, we must face the fact that we have not yet quantity production and sales at the present time. What are we going to do about it? The answer would seem to be that it must be a case of hand-picked selling, then hand-picked selling it at 10 times our standard product. For five thousand dollars in order to make any net loss let's go after people with five thousand dollars.

There are plenty of people in this country who can afford what the modern airplane costs. The trouble is that we have made only a half-hearted effort to secure them. Let's make a plan to find them. Let's make a plan to sell. If the market appears to be saturated for our product, let's do some market research and some market analysis. How many people in Texas can afford the price we ask? How many have a need for what our product will give them, etc., etc.? How many in Maine, New York, Kansas, California, and the rest of the 48 states? We do not know. Well then let's find out. Let's determine the market in figures . . . accurate ones, not guess work. If we can't do that, then let's employ someone who can. If we are a big enough flier let's set up a research department and acquire all that valuable information. Then when we get it, let's go out and comb to the last prospect. But the idea is, let's research and develop the market that can afford our product and the market whose needs are best filled by our product. If the Jones Company is selling the less wealthy man next door a cheaper product let him go ahead with it. Let's stick to our market. In short, stick to our location.

Do we need dealers and distributors? Maybe yes,

It is unfortunately true that the industry has made many uncharitable mistakes since Lindbergh's flight. Some of these were unavoidable, others were not. However, each mistake taught its own particular lesson, and out of all that will come future progress for those who keep hammering. The industry is not up against a brick wall, neither is it hitting an all air. This article which deals with past mistakes, and their effect, does not attempt to offer definite solutions of the many problems that confront the industry. It merely suggests, by comparison with what has gone before, methods of attack which, if true, might lead to possible solutions.



A Sikorsky S-40 transport operated by Pan American

maybe no! But at any rate let's not get the idea that a distributor and dealer organization loaded up with our products means that we are building up sales volume. It doesn't. It merely means that we are getting planes out of our factory. Selling only 100 planes to satisfied customers means more to the future of our business than 1000 planes in the hands of distributors and dealers.

And, as to our product. We honestly believe that it is sure fire. It probably is, but have we really and truly tried to convince the public of its quality, and more than that, of its utility? We've made all sorts of world records, we've made an attempt to fly right, and we've made the public want to be the top dog and out of the underdog. That certainly helps the cause. And now we tell that public that it should buy our product, that it should buy us. The public probably considers the aircraft and then one of our products goes onto the ground and there is no sale. Why? Because we've been hammering on zero glory and not zero utility.

And when we come right down to it, have most of us really made any attempt to give the man in the street an surprise he wants? We have not! As a matter of fact

easy of us have really disregarded the desires of the customer. What we were doing was making airplanes with one hand and holding a shotgun in our cartridge belt. If you point it on his shoulder, so did we. If he forced the sales strike and got his h-d nose, he did the same thing and charged it up.

Competition is the spirit of business. That is, the right kind of competition. But has aeronautical corporation brought about the best results? Is it a yes, yes. We have higher speeds, quicker take-off, better climb, etc. But haven't we sacrificed the desires of the customer to get those added "features"? In short, hasn't we really made an effort to find out what the customer wants in his plane? And, perhaps, better still, have we tried to tell him to show him, to prove to him what value our product will be to him other than is what has always spoken between two points in the instant that may possible?

THAT THROUGH THE light of inquiry on our advertising. We've spent thousands on advertising in all of its various forms. We've tried to do it ourselves. Then some of us turned the job over to a 19 year old high school graduate. And after that we mad agency after agency, and we are still dissatisfied. Why? Perhaps it is because we have failed to realize that commercial advertising is an art in itself. It is a powerful sales weapon and when correctly used can be just as beneficial to us as it is to others.

Perhaps the advertising agency to whom we first gave our service was not as well versed in aeronautics as we were. But it probably was exceptionally versed in advertising. And so was the second agency, the third, the fourth, the fifth. But we, riding on the crest of a sales boom wave, naturally figured that sales from advertising were but a matter of course. When the decline came and sales dropped off we immediately put it down to lack of advertising. We tone into the agents, and still sales kept dropping. Then we rethought the account and took it elsewhere. The same thing happened, and we continued to buy an account around like a ping-pong ball. And what really was the answer? It was an impossible doctrine that all the advertising in the world could not have stemmed. The agency was really doing a good job for us and we couldn't realize it. The agency was building up a market, presuming of logical results, and because we had based upon were results in the first place. What didn't we know? Let me tell you, other than understanding the industry? The answer is no. Advertising is a sales weapon that takes time to show results. Quite often it is impossible to trace results to advertising. Yet it is an essential part of selling that has got to be worked naturally. It is a common business mistake to begin economy by cutting advertising costs. If the advertising is well handled, every dollar cut from the budget automatically becomes one dollar's worth of sales resistance to be overcome.

In short, if our agency is applying itself let's give it a fair try. The agency is a group of market specialists. We're a group of engineers and manufacturers trying to do everything. That in itself is good enough why we should seriously consider the inauguration of a research department. Let that department work with the agency. Let them both conduct surveys, analyze market conditions and possibilities, and co-operate with our sales organization. We couldn't possibly have any better contact with the men who sign the dotted line. He is not in our front door now. We do not know where he is. Research and advertising will seek him out and catch his eye. Our sales force will convince him, and another of our guides will

be guided by a satisfied user. That and the service which we will place at his command to what will build for repeat business. Repeat business, perhaps even more important.

Individually, our sales organization is an atom which we have no inclination to seriously as it might have been considered. As we all know that we have been as a *larger* market, not a *smaller* market. That of course was due to the well known fact that there was no market outside of our own industry. Therefore, a lot of us slipped up a lot on our sales organizations. We appointed distributors and dealers in kit-and-ready style. We lined salaried men in the car load, as it were. Territories were allotted without much thought, and everyone was loaded to the roof with our products. We do not need to discuss the results. We know perfectly well what they were. We did, however, learn some valuable lessons. Next time, in fact right now, let's single out our distributors and dealers if we finally decide that they would be more advantageous to us than our own factory branches. Let us who hand-sell our salaried men. Let's take the time to train them if we want sales. But at any rate let's get astute and not play with a good line of charter. First class pilots may be, but that qualification does not necessarily make them good salesmen.

IN SUMMARY we are making a good product. We shall continue to increase its value to the owner. It is easy to see that the future will find us making a product entirely different to us in our present marketing methods. We must change. But how fast what we want are sales for the product that we are marketing. Sales for a product we know is good, is worth the price we ask, and is suited to the needs and requirements of its market.

It will take time to build up those sales, for we must first research the market for which our product is best suited. And then it is must develop that market by means of commercial education backed up by the quality and performance of our product. And when we speak of time we do not mean next week, next month or next year. It is true that the longer the wait the night, the lower are the sales. However, the task of building up increasing sales volume in a house of another color. Perhaps we'll view of the fact that we are really starting from scratch in this business of selling aircraft products and keeping them sold.

Promising sales figures we have, are results, not of much value. They were set up to bring in customers.

We do not know what actual sales levels are in this industry at our.

We will know in time. How long. Is something that is steadily up to us.

And to accomplish all that will cost money... a lot of it too. But we have money in this industry. It may be controlled by persons who want first to be shown. Then let's show them, not by pretty talk, publicity performance stunts, and wild air shows, but by sound, practical business plans. And let us not be merely in spending that money, yet let us be wise. At present most of us have a great desire to slash expenditures left and right. Let's think twice about that. We are at the low level just now, and many times that is just when we should use the purse strings and spend the money.

Research and education make up the task that is ours. It is no time for optimistic charter. It is no time for pessimistic writing. Neither the death-shill nor the trumpet of victory for commercial aviation have been sounded. It is the time to apply cut and dried business methods to a cut and dried proposition. So, let's go... contact... more intelligent thinking and work and less talking and running around in circles.

SELLING THE De Luxe Plane MARKET

By C. W. White

Vice-President, Bach-Jewett Company



Interior view of the studio of a famous test pilot

WE OF THE INDUSTRY have always tended to be a bit remote about this aviation business, and here too often, misjudged the job of selling airplanes as an avocation, rather than a broad and honest vocation. Our general tendency during the years in which aviation has been growing up, was to fly and get glories to fly for the money take care of itself. During the past two years, however, the general public has stepped onto the scene, and urged us heartily to clean up our cockpit-pilots of aviation. From a parsimonious aeronautical assessment of amateur financial status, glamour has been changed into an established business enterprise whose only legitimate excuse for existence, whether we like it or not, is to earn profits and pay dividends. Therefore those of us who hope to remain permanently connected with the manufacture, sale, and operation of aircraft must have profits as our primary thought and motive at all times and every move that we make must be calculated in plain, once-blank talk on the instant sheet.

At the present time the industry is more or less mired with a situation of "spotty" development. Certain types of planes and certain sales methods have been exploited beyond reason while other planes and methods have almost completely passed by. I say that the industry has been "born" at a certain point by such developments, but has not yet evolved the wide variety as yet. Industry is not well rounded out and only developed in all of its basic phases of the industry and apply their major effort to the development of such, will thereby profit very considerably. At the same time they will be performing the patriotic and commendable function of assisting an overgrown infant industry to mature in a normal fashion.

Although the wireless development of the aviation industry is still infant and hardly requires distress, there are outstanding examples of unexploited fields

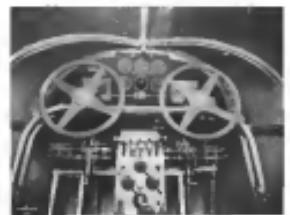
According to Mr. White . . . "The de luxe market is not the biggest but we think it is one of the best, especially at the present time. We intend to build and sell exclusively in this market, with the prospect of making a fair profit on each individual plane sold, and we believe that several other manufacturers will do well to specialize in this phase of the business." "In this article Mr. White states his views on the problem of 'who and where shall we sell during 1928,' and puts forward his reasons for favoring 100 per cent concentration on the de luxe market."

to the requirements of those who can afford to pay for the fastest and most luxurious form of transportation. Considering exceptions have been the de luxe craft developed by Sikorsky and Loening, the executive model planned on the market by Lockheed, Ryan and some others, and the custom built air liners now being marketed by the Bach company. It is this latter type of plane that we of the Bach company feel holds the greatest promise of profits among all the more handily exploited fields, provided that an efficient sales plan is coupled with the manufacture of such a plane. For the benefit of aviation in general we feel that the development of nonstop flying of the quality type, featuring *de luxe* air liners, which safely transport the leading people of the country about on business and pleasure trips, will do more than any other sort of miscellaneous flying to sell aviation in the general public.

AIRCRAFT will surely cover all the phases of transportation, from already developed by surface craft, either land or water. Just as the automobile has now become the most widely used as a freight carrier, so now comes along increasing application for aerial freight carriers for handling the media, express, and many types of commodities. We have passenger and two place jets just as there are transport auto buses, and automobile tank, limited passenger trains, and short haul interurbans, seagoing and coast-wise liners and cross-channel ferries. The one phase of aerial activity which has been least developed is that which would fall in the same class with the cabin express carrier on the water and the Hall-Hayes V-36 airplane Cadillac, and other custom de luxe motor vehicles on land. Airplanes of a certain type are adaptable to the most luxurious and most efficient transportation, and it is this transportation that many wealthy people, who can well afford the best of everything, are now ready to adapt to their own uses. The average travelling man will be making the established air transport lines in tremendous numbers before the close of 1939, but the big executives of the country will find it to their advantage to cross from East to Mid West or from Coast to Coast, in luxury or economy, and they now come from New York to Miami, or New York to Boston or the Miami coast at their water carriers.

The business advantage of being able to combine work with pleasure through an aerial cross country cruise with several customers, at with his immediate family and servants aboard, with all their baggage, is going to lead the business man who can afford it to provide himself with an air cruiser for his business trips. Even though he uses his air cruiser but once a week the business man will find the expense of maintaining it at least as justifiable as the cost of maintaining a water cruiser which can at best be used only where there is water available. A recent conservative estimate of the cabin cruisers in use in this country costing \$30,000 or more shows that there are at least 3,000 such boats. We believe that this year will be followed by sales of *de luxe* aircraft in wealthy private ownership and while we cannot hope to sell a plane to every owner of an expensive boat, the fact that there are several thousand such very rich individuals that the field for aerial craft sales is very large.

A conservatively manufacturing program and intelligent marketing plan should make it possible to fill aerial demand created aerial cruisers a year or so very handsomely profitably to the manufacturers who specialize in this market. There is every indication that the eventual use of such aircraft will far surpass the use that has been made of boats of a



Exterior and interior view of a
multi-decked *de luxe* aircraft.

places most remote on the ground. For this reason we think a sounder that the luxury plane be multi-engined, extremely maneuverable, and of superior performance.

Bending up from this proved and superior chassis it should be the aim of any company entering to the luxury field to cause build the airplane into the most distinctive craft, both inside and out, that can be produced. Such work requires the cooperation of the best architect, upholsterer, interior decorator, and artist. More and more the wife and her artistic taste will enter into the requirements which the custom built plane must meet. Our luxury plane must be both distinctive and material, and the interior should be the last word in comfort

A feature which we consider most important is that there are no instruments in the cabin to remind occupants that they are in an airplane. We believe that the plane owner will be better satisfied to employ a pilot upon whom he can depend to take the plane where desired, without any attention on the part of the passengers, and that those engaged in the trip should be no more interested in the air speed indicator than is the treasurer except of a ear interested in the speculator reading.

In selling such planes we think the prime objective should be to sell the plane at a time and to make money on each sale, but in other words to be conservative. It is the same time throughout the present market. It is quite evident to determine the nature of the prospect for an aerial cruiser and not to waste time on those who cannot afford to support a luxury of that nature. There are already enough wealthy persons who have been sold on aviation in general, that we would probably best concentrate all of our sales efforts on those people who believe in airplanes as a means of transportation, rather than, extending our sales efforts out among the vast number of people who may have money enough but who have no inclination or desire to own an airplane.

It is a relatively easy matter to determine whether a prospect is really a lover of airplanes and whether he is financially able to undertake such a purchase. Once these points have been determined no reasonable effort or expense should be spared to sell that particular prospect upon the advantage of an aerial craft owner.

Wherever possible the Bach Company has followed the practice of showing the prospective and determining his transportation requirements. At every opportunity a Bach plane is placed at his disposal to demonstrate the basic idea or pleasure trip where the advantages of owning a private airplane can be well demonstrated. A regular procedure with our sales organization is to organize a party of prospects and take them for an evening flight out to Palm Springs, a desert resort beyond the Sierra Nevada coast range of mountains and with an atmosphere worlds apart from that of the city so quickly left behind. In a short flight of six hours the prospect is carried smoothly and in the utmost luxury, on a trip which would require several hours by any means of surface transportation. By setting him down in a new world of desert and romance, yet in a resort offering every luxury, the prospect is shown the unsurpassable qualities of the airplane as a means of personal transportation. The night demonstration, with the knowledge that there will be no interruption flight to the point of destination, proves to further enhance the value in the eyes of the prospect.

Because the field of purchasers of the cabin built air cruiser will always be considerably more limited than that of other classes of aircraft, we believe that a distinctive sales method should be followed. It is a peculiar fact that the purchaser of expensive cabin built vehicles, whether land, water, or air, takes particular delight in having a direct factory contact. He likes to give orders to the factory direct and have them carried to his slightest whim. He feels that he is paying a considerable amount of money and in return he wants the entire factory to bend every effort to please him. This situation necessitates the desirability of dealers and makes it more logical to conduct sales direct from the factory through a few factory branches or well established distributorships at the larger centers. The service problem is diminished because owners of such equipment usually send it back to

the factory periodically for rebuilding or refinishing, while engine service is available throughout the country on any of the leading makes of power plants. Therefore we try to have all prospect go through the factory before buying so that we have "face to face" contact right at home.

We can show the prospect every detail of the plane's construction, selling him first upon the after dependency of the product and upon the reliability of the factory in general. From there it is an easy step to work with the prospect to plan the trip to exactly meet his specifications, so that when the sale is made we can be sure it



Inside of a de luxe *de luxe* looking toward pilot's compartment.

will be entirely satisfactory upon delivery. Such a sale does not require an extensive organization, and logically results in some form of dependable representation, say not be either an aerial distributor or a factory representative. In many cases it is possible to make an arrangement with men in other lines of work to keep an office as a sales possibilities in their territory and to arrange for actual demonstrations by a factory representative touring in a demonstrative plane. If a sale is made the local man is rewarded with a liberal commission. There are, of course, many details of selling that work with such a plan, such as consultation to plan who amateur prospects, and the power of giving all informed persons an opportunity to fly the plane, whether or not they may be prospects. This latter point is quite important in all fine plane selling because many form of wealth goes directly to the air adviser before actively considering

As we view the present and probable future aircraft market, we vision not company, and others coming to the market built private air cruiser class, as filling in a very real gap in the completely rounded out industry—producing and selling shoulder to shoulder with the companies in the training plane, sport plane, business plane, or transport plane markets, but actively competing with none of these other divisions. We think that the most beneficial thing which can be done at the present time is to help both the entire aviation industry, and each individual unit in it, for all units to analyze the entire field and to specialize in that particular phase of manufacture and marketing which generates profits on each vehicle produced, while at the same time trying to round out the complete aeronautical industry.

THE Packard Diesel

AIRCRAFT ENGINE

By EDWARD P. WARNER
Editor of Aviation

THE DIRECTOR SHAW, brings the Packard Diesel aircraft engine into the light of day. Only upon the Packard Company's own word and written in a number of airways by different manufacturers, it will be open to the examination of the writing public.

For two years its details have been a closely kept secret. Early in 1936 the company was ready to let it down as the power plant of a Stinson monoplane, the first occasion of an aircraft driven by an engine without electric ignition. Late in that fall, and again within the last few weeks the writer was privileged to ride behind it. In December Capt. L. M. Wobson, the designer, gave a broad indication of some of the engine's general characteristics in a talk before the Society of Aeronautical Engineers in Chicago. In May, 1938, it gained public attention and the brothers once more when it was sent upon its first cross-country trip, carrying Capt. Wobson from Detroit to the annual field day of the National Advisory Committee for Aeronautics at Langley Field. In April, 1938 it is formally revealed.

In general appearance and in general behavior on the dynamometer stand or in flight the Diesel is no vital particular dissimilarity from the radial aircraft-electric ignition gasoline-fueled engine that it has now evolved from. It is, however, a much more compactly housed and for the purpose of saving of the conventional accessories. The Packard engine at its present stage of development, the model which is to be on exhibition at Detroit and which has recently received the Department of Commerce Approval Type Certificate, is the familiar Whirlwind and Wasp, the standard six-cylinder types of the time when the Diesel was undergoing its early development, being a nine-cylinder radial. Like the J-5 nine-cylinder Wright, the only compression-radial in use at the time when the Packard engine was first put into the air, it develops 225 hp under external rapid conditions. Normal speed is 1,950 rpm. Weight 510 lb. Thus the engine weighs 2.20 lb per hp. On the occasion of taking the power curve reproduced herewith the rated power was exceeded by about 10 hr.

To get that output the cylinders have been given a bore of 4½ in. and a stroke of 6 in. The piston displacement is therefore approximately 980 cu.in. The power output @200 hp per hr., the brake mean effective pressure 94 lb. per sq.in.



Capt. L. M. Wobson, designer of the engine, and Warner, seen after their transcontinental flight.

The overall diameter of the engine is 45 in. It happens that the power, weight, and over-all character are all within two per cent of being identical with the corresponding figures for the J-5. Both the bore and the stroke in the Diesel are, however, somewhat larger than in the comparable gasoline engine, the piston diameter being 25 per cent greater and the main effective pressure considerably lower. The exceedingly small clearance need in a Diesel engine and the simplicity of the valve gear of course help to keep the overall dimensions down for a given stroke.

There will be few readers of Aviation for whom



Front View in the Main with exhaust manifold

there is any memory of familiarity of the Diesel principle, but those who have had no recent contact with or occasion to give thought to, the type may be reminded that the essential feature is the combustion of compressed ignition apparatus and the firing of the explosive charge by the heat of compression alone. Combustion occurs near, therefore, in exceedingly high to insure that the temperature due to rapid compression of the air in the cylinder will be above the ignition point of the fuel and will consume it as rapidly as it is sprayed into the chamber above the piston. Theoretically, in the ideal Diesel cycle, the combustion takes place just rapidly enough to leave the pressure constant as the piston descends for a substantial part of the stroke and until all of the fuel for that stroke has been rejected. In practice, there are considerable departures from the ideal, especially on high-speed Diesels, just as high-speed gasoline engines show large deviations from the ideal Otto cycle, with combustion at constant volume while the piston is on its way past the top dead center.

Of the numerous problems that has beset the designer of high-speed Diesels in the past, the most serious have been to control the cylinder fuel injection so that it would enter the cylinder satisfactorily, to secure a compression ratio of three times and at precisely the right instant in the cycle, to provide satisfactory flexibility characteristics to insure easy starting and firmly, and for aircraft work most important, to have a reasonably well balanced engine with the thermodynamic characteristics of the engine as to keep the weight within reasonable limits. Captain Wobson, with the aid of Dr. Montague Dorier, who came to the work from a long Diesel experience in Germany, has at least in a very considerable measure solved those specific problems.

To the specialist in Diesel problems such the most striking feature of the Packard engine is the very high maximum pressure permitted in the cylinders. There has been a widespread belief among students of the type that satisfactory results for aircraft work could only be secured by keeping the maximum pressures, and the consequent stresses, to comparatively low values. It is with the development of low-pressure Diesel operation that the work of the National Advisory Committee for Aeronautics has been most largely concerned. Pressures of 400 to 800 lb. per sq.in. have been considered

A Nine-Cylinder Radial Engine of Compression-Ignition Type Developing 225 Hp. on a Weight of 510 Lb.

discussed. In the Packard the design is based upon maximum cylinder pressures maintained in excess of 1,200 lb. per sq.in.

General Operating Cycle and Conditions

The general thermodynamic characteristics of the engine can be best described by following through the cycle of operations which to be sure is in general common to all Diesel engines for all purposes, but with the specific figures and facts inserted in apply to the Packard model.

At the beginning of the intake stroke the piston is at top dead center and the cylinder is very nearly exhausted for the compression ratio of 16 to 1 affords a clearance space of only about 7 cu.in. In each cylinder, or a mean distance height above the piston of about three-eighths of an inch. With the piston is that portion of the valve (it is a notable feature of the design that there is but one to each cylinder) is open to the surrounding air. As the piston moves downward air is sucked into the cylinder, previously as the explosive mixture is injected through the total value in a gasoline engine. Thirty-five degrees past bottom dead center the valve closes, and the air in the cylinder is compressed as the piston moves upward. So far there is no change in the course of events characteristic of a gasoline engine, except that the cylinder is filled with pure air instead of an explosive mixture of air and gasoline vapor. The compression ratio having already reached 80 to 1 and the compression of the air to approximately 1,200° Fahrenheit by the time the piston has reached the upper limit of its travel. Before that time, however, about 45 degrees of crankshaft travel before top dead center is to start, the upper flat opens the fuel pump (of the details of which more later) starts to force the plunger upward in the pump. The fuel which the pump cylinder contains is thus forced out into the working cylinder in a fine spray, which immediately ignites, as the temperature of the air reaches the fire point of the fuel.

As already indicated, the ideal Diesel cycle calls for the injection and combustion of fuel to start at top dead center and to continue for a substantial part of the downward stroke of the piston. In the Packard engine, designed for high-speed operation, the injection starts at 45

degrees before top dead center and continues approximately until the upper limit of the piston movement is attained. At or immediately after this point, the maximum pressure of about 1,200 lb. per sq.in. at wide open throttle is reached.

During the downward movement of the piston the heated gas expands and the pressure gradually falls until with the piston about 45 degrees short of bottom dead center the valve is reopened. The exhaust begins at that point and continues through the upward stroke.

The cycle of operation is thus complete. The single cylinder engine is only used in case of a cycle, remaining open for a total of approximately 440° out of the 720 degrees of crankshaft travel.

So far as the pilot of the airplane is concerned, the operation of the engine is in no particular difference from that of a gasoline engine. It looks much the same to the casual glance. It is controlled through a single throttle in the same way, and responds as promptly. The sound at a very much the same. While the color of the exhaust is distinctly different, and may be noticed in an open cockpit ship, the difference is not so conspicuous as to force itself upon the pilot's attention. As will be indicated later, the operations of starting are essentially similar except for the absence of a switch. Since the engine is similar to the gasoline type in weight, power, and dimensions, it goes without saying that no differences are apparent in the essential qualities of the airplane. A light open-cockpit airplane with the engine installed loops, rolls, and spins with customary facility.

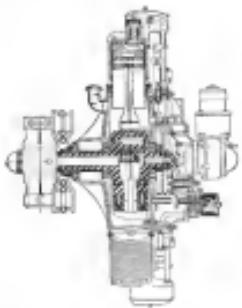
Fuel System and Combustion

AS ALREADY INDICATED, the fuel is injected into the cylinders by nine separate pumps, one for each cylinder. One of the fundamental advantages of the fuel system is combustion chamber for a high-speed Diesel engine is the proper mixing of the fuel and the air. For a number of years the National Advisory Committee for Aeronautics has been conducting exhaustive researches on spray penetration in combustion chambers, studying various forms of nozzles and the effect of varying the spraying pressures and the overflows with which the nozzles are supplied. It has been the general experience that the maximum penetration that can be obtained with a spray of very short duration is startlingly small, at least in comparison with the cylinder dimension. Half an inch is a good penetration. In the case of the Packard engine the time available for parting the fuel into the cylinder is about 0.004 sec. Under these circumstances the designers have adopted an expedient which is also being used in modified form on several recent European Diesel high-speed engines. Instead of trying to spray the fuel across the air supply, they seek artificially to move the air, which will sweep it past the nozzle, picking up the incoming fuel as it moves. The desired turbulence and the increasing tangential motion of the air around the combustion chamber is secured, as well as seen in the sectional view rear of the engine (reproduced herewith) by giving the side part the form of a flattened Vortex directed tangentially around the cylinder hole. The photographs of the cylinders also give some indication of the layout. The air enters at high speed, and moving along the tank and keeps it circulating through the entire system. The fuel passes from the tank into the pump cylinder through ports opened by the movement of the plunger. A screen protects the entry to the pump.

Although purely mechanical features will be left for later description, the method of actuation and control of the fuel pump should be examined in connection with the explanation of the general functioning of the fuel spray despite the very limited direct penetration.

Working back from the cylinder to the fuel pump, a characteristic feature of the Packard design is found in the use of nine separate plunger pumps, one for each cylinder, and placed as close as is mechanically expedient to the combustion chamber for which they furnish the fuel. The arrangement has the dual advantage of reducing the length under the enormous pressure which the pump generates or of compressing the fuel until and injecting it into the cylinder in a series of surges corresponding to the normal pressure waves. All looks like the drawing and in long practice.

The fuel pump and spray nozzle are almost a single unit. The spray penetrates out to a maximum of 6,000 ft per sq.in. The pump is of a simple plunger type,



and will later be described in mechanical detail. The spray nozzle is of a fine form, containing a small poppet valve. The spray is thus coaxial. To make it unnecessary to force the valve off its seat against its spring before the injection of fuel can start, there is a separate cup seat bearing against the end of the valve stem and holding it a few thousandths of an inch off the seat at all times. This slight cracking of the valve is particularly important for easy starting, as well as for the expulsion of any entrapped air. To prevent any backflow of gas from the combustion chamber into the fuel pump a vent check valve is inserted in the barrel between the pump and the cylinder.

Working back to the intake side of the pump, via a line extending all around the engine, as shown in several of the photographs and in the rear elevation drawing, a fuel pump of ordinary form drives the fuel pump by the tank and keeps it circulating through the entire system. The fuel passes from the tank into the pump cylinder through ports opened by the movement of the plunger. A screen protects the entry to the pump.

Although purely mechanical features will be left for later description, the method of actuation and control of the fuel pump should be examined in connection with the explanation of the general functioning of the fuel spray despite the very limited direct penetration.

system. It is shown with admirable clarity both in the sectioned part elevation and in the photograph of the engine with the main cover plate of the cylinder removed, exposing the interior. There is an extra ring or an elongated particular diameter band that runs to reduce frictional resistance. It operates on tappets, which in turn operate the pump plungers through short elliptical rods mounted near their lower and by pivoted links.

It is upon the detail of this linkage that the control of engine power depends. The lower end of the fuel-pump operating lever sits in a specially formed cradle provided on the pivoted rocker that bears directly against the cam. The pivoted link just mentioned is attached at one end to the tappet and at the other to a circular control ring concentric with the cylinder (well shown in the drawing and in the photograph), the rotation of

which close off the open end of the air tube. These shutters are operated by means of a cam connected with the throttle, so that when the throttle is nearly closed the little air is being drawn back through the exhaust manifold. With this control in operation it is possible to run the engine steadily at speeds as low as 230 r.p.m.

Fuel Requirements

THE ENGINE has been tried and has operated with a reasonable measure of success on many different kinds of fuel. The essential requirements include, however, not merely the ability to run but also, commercial availability, cleanliness, as commercially delivered, to avoid clogging of the fuel pump or clogging of nozzles; a low enough pour point and viscosity to insure free flow from the tanks piping pipes of reasonable dimensions, especially at the low temperatures of winter or high altitude; a good degree of "whiteness" to reduce the problems of lubrication of the fuel pumps sufficient ease of production from crude petroleum, and availability in a large enough ratio to the total supply of crude, to insure a reasonably low price, even if the demand becomes very high.

The conditions have been met most nearly by the mixture of the Packard Company by domestic furnace oil, which has a gravity of approximately 32 deg. Bauman, and that fuel has been used in most of the test flying. The engine will operate on gasoline, but not satisfactorily, as the lack of "whiteness" would cause rapid wear in the moving parts of the fuel system.

Starting

THE STARTING is essentially similar to that of a gasoline engine. An inertia starter is used, and the only differences in technique are that there is no switch and no preliminary priming or choking, the throttle being held wide open when the starter is thrown into action. When starting at low temperatures some pre-heating is necessary, and is provided by an electrically heated glow plug in each cylinder. These plugs are permanently connected into the starter motor circuit so that they are heated whenever the starting motor is being energized, no independent action on the part of the pilot being necessary. They are only needed when starting, and are entirely inoperative at other times. Although the glow plugs are only required at low temperatures, in the interests of economy they are left permanently connected up, so that they are always at proper temperature.

In the early tests several types of inertia starters were used, especially an engine-type which is black shotgun shell as the starting motor, but they were subsequently abandoned in favor of the inertia type.

High Altitude Operation

SCREENS upon the aircraft should have frequently forecast that the engine would be unable to operate at high altitudes, as insufficient heat of compression would be developed. It is known that in some cases there has been serious difficulty in operating radial Diesel in South American cities and at other points far above sea-level, but the temperature developed in compression should theoretically depend only on the compression ratio, not at all on the initial pressure of the air, and in practice the Packard company appears to have experienced no difficulty with their own engine. Both of the two planes on which it has been installed have been flown to over 18,000 ft above sea level without any special accessories on the engine and without any failure of its functioning.



AVIATION

April 5, 1939

One of the performances of the Diesel is its ability to run at a given throttle setting (other than full throttle) with increasing altitude, as opposed to the usual drop in the gasoline type. The amount of fuel injected into the cylinder is quite independent of altitude being dictated by the fuel pump under control of the throttle, and if the engine is throttled back to develop half of its full power at sea level, the amount of fuel injected is sufficient to continue with all the available oxygen, thus giving the equivalent of full throttle operation at that altitude. Conversely, it is of course impossible to keep the throttle wide open at high altitudes, as an excess of fuel beyond the continuing capacity of the induction airways would then be injected. Obviously, there is no need and no opportunity for a separate throttle control on the Diesel.

Brake Power

ON THE OTHER HAND, however, the Diesel is the possibility of "overrunning" seems to be considerably increased in torque and power output beyond the rated point at the sacrifice of fuel economy. For taking off and climbing the engine power can be temporarily increased by about ten per cent at the expense of a twenty per cent increase in specific fuel consumption. The explanation lies in the necessity of providing a certain amount of excess air to insure complete combustion of the fuel injected. The normal rating of the engine is based on a 25 per cent excess. If the throttle be advanced another notch and the amount of fuel that flows into the cylinder be increased to the full theoretical amount until with the oxygen content of the cylinder could combine chemically combustion will actually be incomplete and economy correspondingly poor, but as already indicated the power would be stepped up. The incomplete combustion under these conditions is shown by a trail of smoke.

Lubrication

THE LUBRICATION system is in a general way similar to that of a gasoline engine. As in other radial engines a dry-sump system is used, the oil being pumped from the tank and fed to the engine through a special hollow rocker arm pin bearing No. 4 cylinder. At the forward end of this oil a groove is arranged in the crankcase diagonal and a radial hole is drilled leading the oil to a radial connection which receives one end of what appears to be a hollow shaft. The other end of this swinging connection engages a slot in a longitudinal ring feature on the hub of the case. The oil is let through a groove in this ring to several holes in the case and thence through drilled passages to the before extension of the rear crankshaft hub. It might be mentioned in passing that the purpose of the crankshaft connection referred to is to allow the oil ring to float concentrically on the case without being restrained in any direction by the connecting member.

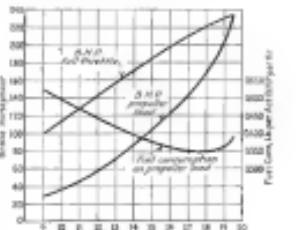
The rear crankshaft is drilled in line with a hole in the outer housing plate with the intention thereof which is located not for lightness and to act as an oil reservoir. A hole is drilled in the crankcase for lubricating the connecting rod bearing which is formed of two bushings (one steel and one) to fit into this space with a space between them. Oil flows through this space into slots machined in the outer connecting rod big end bore and thence through small holes drilled at an angle to bring oil under pressure to the link rod pin bearings.

Referring to the crankcase discharge oil passages the main radial feed hole which supplies oil to the oil

ring is fitted to be extended to send a groove surrounding the rear roller bearing boar. This circular groove distributes oil through eight other radially drilled passages to each of the hollow roller arm shafts. These shafts, in turn are drilled radially with small holes to provide pressure lubrication for both the fuel and valve rocker arms. The valve rocker arm is further provided with a small drilled passage in one of the webs leading out to the rocker arm roller pin and this pin is drilled with several radial holes to lubricate the roller bearing. The endcase cover is also drilled with various passages so that positive lubrication is supplied to the various necessary shafts and their bearings.

On the return circuit the oil thrown from the various bearings gathers in the bottom of the crankcase, a slot being provided at the bottom of the discharge to permit the oil to flow from the front compartment of the crankcase to the rear compartment.

The converging of pump is mounted in a tank with the pressure gauge and relief valve of the screening pump consists mainly of a gooseneck shaped tube draped to



Performance of the Diesel engine at constant rated load and constant engine speed, compared to standard 100% rated torque

the inside of the crankcase cover and attached to a waste screened funnel arranged to suck the oil from the floor of the rear crankcase compartment.

The scavenging pump then discharges the oil back to the oil tank in the regular way. It will thus be seen that all bearings within the engine are positively lubricated except that the anti-friction bearings, piston pin bearings and cylinder walls are lubricated by spray or splash in the normal manner.

The external valve rocker arm bearings are of the roller bearing type and are lubricated periodically by means of a pressure gun, each lubrication being required every 25 to 30 hours of engine operation.

The relief valve in the oil feed line is set to bypass the oil at 60 lb. pressure.

Mechanical Drive

IN ORDER to keep the weight of the Diesel low enough to make it competitive with the gasoline engine its unique refinement in mechanical design is necessary. Captain Warden observes that it is easier to design a Diesel on theoretical principles than any other type at

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engine, since there is no abnormal condition, such as detonation, introduced into the gasoline powerplant to allow for. Maximum operating pressures can be accurately forecast, and the design based on the anticipated normal conditions with some assurance that they will not be exceeded.

PROMINENT most striking mechanical feature of the design, well shown in the quartering front photograph, is the use of a one-piece crankcase, with pressurized air distributing the torsion load on the cylinder bases due to explosive pressures over a large part of the periphery of the crankcase before transmitting them through to the main bearings. In place of cylinder studs which necessarily impart a localized load to the crankcase, two changing bands running around the crankcase and over the bases of all the cylinders are used. These bands are tightened up by turnbuckles so that an initial tensile stress is set up which exerts any operating stresses resulting from the cylinder explosions. The crankcase is thus subjected to an axial compression, and the tight banding is never allowed to sustain tension which it is ill adapted to resist. The crankcase weighs but 36 lb.

The explosive pressures in the cylinder being very high, preliminary calculations had to be taken to prevent the outer structural frame from being impacted. This has been accomplished primarily by a flexible mounting of the crankshaft counterweights and the propeller, so that when the peak pressure exists there is a plenty amount of cushioning between the crankshaft and the parts that have the maximum rotational inertia. Stresses in the crankcase can thus be greatly reduced.

To be specific, the crankshaft counterweights, instead of being rigidly bolted to the crankshaft or forged integrally with it, are hung on a pivot and centered between powerful springs. When the crankshaft is suddenly accelerated, the counterweights lag behind slightly to reduce the effective inertia. Similarly the propeller hub, instead of being splined or keyed to the crankshaft, is allowed to float on an extension of the crankshaft driving end. The propeller blade dampens out driving torques which receive the driving effort from a two-armed driving ratchet splined to the crankshaft (well shown in one of the photographs of the engine mounted in an airplane). At the end of each of these and the corresponding propeller hub driving rag is held between two intermeshed rubber blocks, each with a small amount of yielding. The propeller hub is thus protected from driving shocks and can be made exceedingly light.

Arguably with experience of torsional vibration will immediately be suspicion of this allowing torsional flexion, as likely to aggravate vibration troubles. These appear to be overcome by the inherent hysteresis and damping of the rubber blocks, together with the mechanical friction between the parts joined together.

The cylinders weigh only 114 lb. The heat losses through the cylinder walls being lower in a Diesel type than in a gasoline engine it is felt to be unnecessary to use a separate cylinder head of aluminum alloy for better heat conduction. A closed-end steel cylinder is therefore employed, with an aluminum alloy cover, cast and with cooling fins, held over the top by bolts. The primary function of the cover is to furnish a mounting base for the valve gear. The valves are operated by a conventional push-rod and rocker-arm gear from a cam ring integral with that driving the fuel pump. In accordance with past Packard practice on gasoline engines, a simplicity of springs are used (as shown in one of

the photographs). The overall number on each valve is twelve, the object being both to prevent the liability of loss of a cylinder due to the breaking of a single valve stem and to reduce the possibility of seizure in the springs aiding the valve operation singular.

Plates and connecting rods follow standard practice, the master rod assembly being of the counter-balanced type. The pistons are of aluminum alloy. The peculiar form is shown in one of the photographs, the eccentrically placed pocket helping to provide the swiftness necessary to high-speed operation. Each piston carries two compression rings and one scraper ring low on the skirt. The crankshaft is also normal being of the split type with the front and rear halves bound together by a clamping bolt. The main crankshaft bearings are both roller bearings, the front one being mounted in the crankcase itself and the rear one in a removable plate or flange fitted into the crankcase in line with the rear cylinder-bearing bore. The displacement itself is located in place by studs, and carries most of the working parts pertaining to the fuel system as well as the rear main bearing.

The crankcase, as previously noted in connection with the use of the method of cylinder attachment, is a one-piece casting of magnesium alloy. The casting includes both the smaller portions of the crankcase and the front end.

Most of the accessories are housed inside the rear end of the crankcase either between the cylinder just behind it and the cover plate or on the outside of the cover plate itself. None of the accessories offer any special mechanical problems as to their design or installation except the fuel pump, which has to operate in a short a time interval in each revolution that the mechanical and dynamic load becomes enormous. Some of the parts operate at accelerations as high as 15,000 ft. per sec. per sec. or nearly 500 times gravity.

The pump is made of alloy steel forgings. The plunger is of heat-treated steel. The actuating weights serve only to thrust the plunger upward in its cylinder, the return being effected by a compression spring surrounding the cylinder.

THE ENGINE AS HERE described comes to the Show with several thousand hours of dynamometer operation and several thousands of miles in mass-production flying in two planes, a Stromson monoplane and a taper-wing Waco. It is a 1000-hp. engine with a four-cylinder. Eight experiences are included in great variety of state and atmospheric conditions, including the use of radio in the plane, the first direct verification of the theory that there can be no radio interference where there is no electrical apparatus. Temperatures as low as 37° are below zero Fahrenheit have been encountered. The general performance of the plane has been found practically identical with that of the same machine equipped with a gasoline engine, as might have been anticipated, since neither weight, power, nor frontal area were appreciably changed. The fuel consumption, however, was reduced, being seven min. and ten gallons per hour when cruising. The fuel consumption of the Diesel under cruising conditions has proven exceptionally satisfactory because the Diesel under standard conditions automatically yields its maximum efficiency, while with the gasoline engine the best possible consumption for any given throttle setting is only to be obtained by a more careful regulation of the mixture control than the average pilot is likely to give.

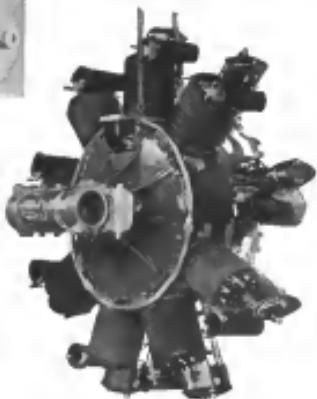
DESIGN DETAILS OF THE Packard-Diesel



Piston, rings, and piston pins combine to prevent possible change for the shape of the piston head.



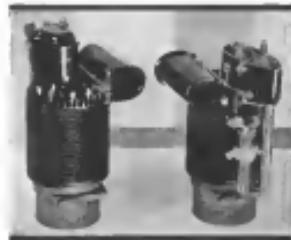
The one-piece cylinder is a magnesium casting.



Quarterly front view, release manifold removed. Ready for the installation of release manifold and propeller blades.

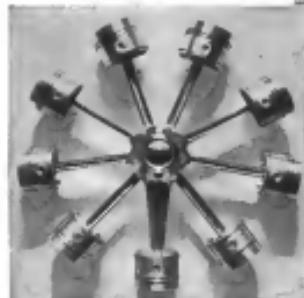


Exhaust, showing particularly the fitting of the two ports and the effecting of the connection between the two ports without the use of any two-piece construction or non-interchangeable parts all in a single metal casting by injection.



Front and rear view. The cylinder liner is held tangentially at one side. The fuel pump will be held in place.

AIRCRAFT ENGINE



Rock valve box valve springs mounted on a spider sleeve.



Bottom: Front view with cylinder cover removed; at left: Rear view with cylinder cover removed; above: Front view showing intake air ports and cooled mechanism becomes visible. Note heat going from engine and jacket.



Cylinder and head and valve cover. The used cylinder has a closed end with a cover plate to carry the intake tube and outlet pipe.



Fuel pump and spray nozzle, one for each cylinder, are made up in a unit.



A view of some planes at the 1935 All-American Show.

THE THIRD *All-American*

Aircraft Show

*Some Interesting High Lights
Detroit During*

By JOHN T. NEVILL
Deputy Editor of AVIATION

WHEN THESE LINES are published the third annual All-American Aircraft Show will have opened in Detroit. There seems little doubt but the industry will attend the show with a new and stronger hold upon itself. That is to say that it will probably have head and shoulders, at least, one of the financial departments that settled upon all business some six months ago.

Meanwhile it would seem that the industry has looked forward to the Detroit show as an ideal place and time to converge upon on certain all-important experiments that have been, to a host most recently, these experiments being both ergonomic and technical. Many nowdays urge the feeling in the industry was mutual that the airplane had been sufficiently advanced, technically, to warrant more or less general acceptance by the public.

This was followed by a period of excessive and decidedly wise production, or rather over production, which was made more costly and in some cases ridiculous by the stock crash of last Fall. More recently the industry has come to realize that it had taken the "idea selling" flights of 1927, '28 and '29 entirely too seriously, but the selling of aviation as a world-wide utility was yet to be demonstrated.

Elaborating a bit on these features we return again to Diesel engines. The Packard Motor Car Company, builder of the only Diesel type airplane engine in this country that might be regarded as proven, will display its 285-hp. Diesel in the All-American Show. This engine, which has been under development by Capt. E. H. Woodson, of the Packard Company, for several years, is described in detail elsewhere in this issue. Further than that it is virtually certain that the Packard Company will have its two Diesel-powered planes—Spartan-Darwin and a Waco—in the field in order to demonstrate their flight.

Promised by many operators the industry about five months ago began experimenting with price reduction as a means of regaining public patronage. So far, speaking generally, the experiment has shown great success but high fares have kept approximately 30 per cent of these seats empty, also the larger passenger planes are useless. Price reduction in the manufacturing field is still too new an experiment to know much about what the results will be. Those who started in are confident of its benefits.

The foregoing thoughts have been emphasized here

at the start solely because they constitute the three underlying the third annual All-American Aircraft Show. Reduced prices in small aircraft, increased passenger carrying capacity in the larger types, and Diesel type engines will comprise the keynote of the show.

The third annual All-American Aircraft Show, an exhibition open two years, is sponsored by the Aircraft Bureau of the Detroit Board of Commerce, assisted by the Association of Chamber of Commerce, Yachtmen and managed by Ray Cooper, of the Detroit Bureau. The same group of automobile manufacturers' bankers is on the Show's executive committee, and the industry can safely assume that the dynamic quality that has characterized Detroit's two preceding shows will continue.

Aside from the usual number of new planes and new models of established planes two outstanding features will set the show apart from anything of its kind ever attempted heretofore. Probably the most important of these is the first public showing of the long awaited Diesel. Second, the exhibition will be held as an air port, approximately five miles from downtown Detroit, and will cover 190,000 sq. ft. of the largest airplane hangar in the world, an imposing \$1,000,000 structure containing a total of 205,000 sq. ft. of floor space. (The Detroit City Airport and Monogram Hangar is described in another article in this issue.)

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The Spartan Aircraft Corporation, a subsidiary of the Cast Corporation, which concern surpassed man-

ufacturers at St. Louis with its well known mass production-low price announcement, will exhibit a Sparrow Junior equipped with the Packard Diesel. Rumor has it, fast, that there will at least be half a dozen planes in the show powered with Diesels. Although, at this writing, no definite announcement has been made, plans likely to be so equipped will include besides the Sparrow, the Ryan, the Waco and the Verville. A report that Ford would display one of his tri-engaged, all-metal monoplanes with Diesel powerplants, remains unconfirmed as this is written.

The Detroit Show, according to the latest figures, will feature a total of 82 airplanes and four gliders, started by 44 manufacturers when covering voluntary companies as units. There will be 118 accessory booths, numbering among them approximately 15 engine manufacturers. Judging by the exhibits entered a more representative aggregation could scarcely be brought together.

That the Detroit Show will be held under one roof, open one face, and within a few feet of demonstrating planes on the Field as is conceivable assist to the industry as well as to the show's leaders. The robust and expensive process of moving a plane, says wings, through encumbered indoor streets has been eliminated, yet Detroit City Airport is but little further from downtown Detroit than is Commeration Hall, where the All-American Show has been held previously. Nor is dismantling the airport necessary—even for the Fokker F-22, which will be the largest plane in the listing. Most of the exhibited planes, in fact, will have been flown to the airport, towed to the hangar's enormous spray dished of fuel, and rolled in to its exhibiting area. Others, of course, will have been shipped in, crated form, some of them it is understood, directly from St. Louis, where they were built and exhibited.

Each of the exhibiting areas, by the way, have been given names along "airways" or "passageways of varying width appropriately called "airways" and bearing such names as Lindbergh, Richard Byrd, Mason Patric,



A section of the grandstand at the All-American Show.

MicMacKees, etc. The huge structure's interior will be decorated brightly in blue and gold, more than \$5,000 yards of bunting being required for this work.

Although the Detroit Chamber has designed the All-American Show as an advertising and sales medium for the industry it is determined to let the exhibitor whose aisle or subsection methods are not in keeping with the dignity of the industry or character of the show. The "good taste" check of one would-be exhibitor was returned because of so-called "loose grubbing" tactics pursued by this exhibitor at the St. Louis show. While spending of the rules it is worth mentioning that children under 16 years of age will not be admitted unless accompanied by parents or guardians.

The advisability of admitting small boys to certain shows is still a subject of dispute. If accompanied by an adult child under 12, will he be admitted for certain the price of admission for adults being 75 cents. As in past years admission of airplanes, not being charged for space, although a charge of 20 cents per eight has been levied against accessory exhibitors.

With the idea of allowing the exhibitors as much free as possible to make contacts and sell airplanes, the week of the show, April 5-12, has been kept practically free from meetings, the only gatherings of this kind being those of the S.A.E., the Women's N.A.A. and two meetings participated in by factory purchasing agents. The first of these last named meetings, according to plan, will be between the buyers and men from whom they purchase materials, the second being for the buyers themselves. It is hoped, as a result of these conferences, to effect closer, more efficient co-operation between the two groups and to leave them with a better understanding of one another's problems.

The week is to consist, has been divided into designated "days": Saturday, April 5, being opening or Dedication Day. Formal opening of the doors has been set for 3 p.m., instead of the usual 7 p.m. This will be preceded earlier by a formal dedication ceremony participated in by prominent airmen and Detroit municipal officials. Sunday will be Farmers Pilots Day, Monday,

THE Aircraft Market IN THE West

*An Informative Discussion of Past and Present
and the Prospects for Future Aircraft
West of the Great Divide*

By CHARLES F. McREYNOLDS
Pacific Coast Editor of Aviation

SALES of any product follow the law which governs running water, in that the greatest volume will flow, either along the path of least resistance, or along the path of greatest propagation. To this law sales of aircraft are no exception. The market for aircraft never has sold in California than in any other part of the country that takes on particular significance for the entire aviation industry. Either conditions are such in California that airplanes can be sold there more easily than in other portions of the country, or a better organised and more intensified sales effort has been made there, or possibly there has been a combination of both conditions. In any case there must be in this situation lessons of a vital nature for everyone interested in promoting the sale of aircraft. Therefore California deserves a special place in any general sales analysis of the aviation industry. Such an analysis should properly consider two separate phases of the future western situation. First: What lessons can the rest of the country take from a study of what has so far been the world's best market for commercial airplanes? Second: Is view of the past and present sales situation in California the key to the prospect for future sales in that territory?

Because the entire industry is now seeking markets for aircraft the first of the two points mentioned above

will be given primary consideration. The questions most frequently heard within the industry for the past six months have been: Where is the aircraft market, and how big is the aircraft market? These questions have given the impression that the author of these comments was originally seeking a market for surplus stocks of airplanes or for surplus production, instead of making a sincere and scientific effort to determine how many of what sort of airplanes could be economically used where.

CALIFORNIA and the Southwest has been generally recognized as an ideal year-round flying country, a season where business is general in more nearly "as usual" the year around than in any other territory, and where "seasonal sales slumps" are less felt in the circuitous market. Because of that continued selling season, and because the organized Spring flying and selling season opens much earlier in the West, it is possible to "feel" the market trend considerably in advance of the rest of the country.

Bearing these facts in mind it is of real import to know that as late as March of this year California still alone, with the rest of the country, a sales slump of major importance. One of this state's leading distributors of aircraft, a company heading one of the most

Developments, Sales

popular planes on the market, in an extensive territory, has gone bankrupt since the first of the year. Another leading western distributor, with a well organized dealer group, and handling a line of planes from almost every state, reports very poor sales at all stages of the market. The lack of seasonal significance is evident due to most of the small aircraft dealers having ceased to function as far as any organized sales effort is concerned. Also of interest is the announcement by a leading finance company that it will undertake no further aircraft financing of any sort for an indefinite period. Other finance companies are handling aircraft on only the most conservative terms and the general situation is not one to stimulate volume airplane sales on the time payment plan.

Such a picture as that painted by the above sentences, if taken alone, would forecast a rather hopeless sales outlook for California, and for the entire country. However, there are other factors in evidence which give us a better impression of the true market possibilities; the gloomy reports mentioned above having served to reinforce how real the aircraft sales slump has been in the active California market, and that up to the latter part of March there is no definite reversal of that phase of the market.

In sharp contrast to the dull market in new planes is the general report that used plane sales, at comparatively



View of Los Angeles Municipal Airport from the Administration Building

low prices, are very active. Both the Los Angeles (municipal), and the Los Angeles Metropolitan Airport, have reported quantity used plane sales recently, in addition to an increasing interest in new planes, extending only to demonstration flights. Edward L. Endres, pioneer and plane broker of Southern California, states that his business during February of this year exceeded any volume any previous month. Various dealers report an encouraging interest in new planes among prospects who can afford to buy if convinced that they should purchase a new plane. These reports indicate that a normal seasonal interest is reviving, and of more importance, that a considerable volume of sales is developing where prices are sufficiently attractive. Other encouraging reports come from such factories as Black and Decker.

PROBABLY the most cheering news of all is that flying of all sorts in the West is on the up grade. Standard Flying Schools, Curtiss-Wright Flying Schools, and others in the Los Angeles area, Boeing School of Aeronautics, in Oakland, and other flying schools up and down the Pacific Coast report increasing student enrollment. General service operations, taxi work, crop dusting, survey flying and charter trips are all progressing at a normal rate for this season, with the total volume of flying mounting rapidly. The major air lines are showing a steadily increasing volume of passengers, with T.A.T.-MacKinnon, and Western Air Express operating at a consistent average of 50 per cent of full load or better. Since such statistics are the backbone of the aviation industry and provide the major dependable market for aircraft, we may be fairly sure of continued progress in all elementary branches of aviation, no matter how the broad public market for airplanes may



Affording comfort and convenience to the air passenger in the West. A modern and terminal building on the new

Leland Airport in Burbank, Calif.

develop, or fail to develop. Certainly the general public is using the air mail, the air transport line, and other air services in steadily increasing volume. We may, therefore, grant that aviation as a service has arrived and will never be supplanted, unless by some superior and speedier form of transit. Therefore all who build and sell to the "service" portion of the industry, or what is known as our "utility" market, are well assured that their business lies in the future, in the ultimate life of the country. It is this portion of the industry which has been handling aviation as a "business," and which has been trying to rechristen the airplane as the most public which must fight for its life during the next few months, and possibly years.

Returning to the article with which this article opened, that airplane sales, like running water, will follow the law of least resistance unless artificially restrained, we may analyze the California market which has absorbed per capita four times as many planes as the country at large. Sales currently flourish in this territory in the beginning because the weather permits year-round flying; the great distances out here make a high percentage of flying economical for many uses and purposes, because topography of this territory offers great obstacles to the development of surface transport systems. With this acceptance of the airplane came an almost simultaneous establishment of large airplane sales and service organizations. Splendid airports were built, flying schools prospered, and an anticipation of continued expansion of aircraft sales caused many of the dealers to start up. In the early days there was no demand for industry in California, and the West is the law that when popular buying stopped, sales stopped. The sales and service facilities are as good as ever. The artificial channels as organized to handle a buying market are still in existence, but since the market situation has changed, the aircraft distributing organizations have, basically, paralyzed.

As a matter of fact, the popular private market for airplanes has never existed and does not now exist. Nor will it exist until we have in the field strong groups, perhaps symbolized by the General Motors-Fokker combination, which can afford to undergo a pioneering period possibly exceeding ten years. Naturally, it is not to be expected that all aircraft manufacturers with commercial ambitions must be backed by such wealth and power as a group as General Motors. But it does seem evident that most dealers and distributors of commercial aircrafts must be partnerships, either by a differing number of individuals or by a company or group of persons, because profits, as such, will say that sales efforts devoted to the greatest building up of the private market may be extended over a considerable length of time before any dividends may be expected back from such activities. Of course there will be exceptions to this general situation, and some companies of unusual merit and courage will probably continue through the lean years to the larger markets of the future, without any subsidies along the way.

For this most part, though, the development of passenger sales demands a revision of the industry from stem to stern. Artificial channels must be set up which will promote the direct flow of planes from the factory to the purchaser. This does not necessarily mean direct factory-to-purchaser selling but it does mean direct analysis of all market problems by the manufacturer, design and production in types and quantities to satisfy

those markets, and distribution through channels sufficiently powerful to ensure that the right kind of aircraft will be marketed in the right amounts. Such a set-up again emphasizes the need for manufacturing groups powerful enough to conduct the necessary market research, spend the money for operational designs and production, and also to effect distribution channels to establish the right sales outlets. Along with this, it will probably be essential to conduct a sound advertising program of major proportions. If the aviation business is not prepared to conduct such an effort, or is not able to do so, it is apparent that the industry will develop very slowly along strictly "trade" lines with the widespread adoption of the airplane by any considerable portion of the public definitely postponed until some future date. If the latter condition should develop, which is hardly to be anticipated, it is evident that distributing systems would be unnecessary and that all air lines and schools would deal direct with the factory, handle their own servicing, as at present, and leave the private owner to shift for himself.

On the other hand, the aviation industry is really going to organize itself for an effort to develop sales outside the industry if it is evident that we must go out and create new markets. In this respect there are numerous examples at hand of market creation by the manufacturers and distributors of other products which were not naturally accepted by the public and had to be extensively promoted.

WHEN it must be confessed that the airplane is perhaps more complex in design, manufacture, and marketing than some of the products of other industries, the basic principle of pioneering the market creation theme, stands hardly the developing of a popular airplane market is a job for the "big boys" and world publicity has to be left for them to handle at such a time as the prospects for real profits appeal sufficiently to them to sustain the effort and expense of a campaign. The most development of basic flying and the acceptance of elementary air transport services indicate that the time for such a campaign is at hand. In the meantime the small manufacturer of aircraft will completely disappear except in special instances where a local economic condition, or in isolated cases of personal genius, justifies his continued existence.

Some of the stronger units now active in the market are preparing for such an effort as has been outlined above. Some of the methods to be followed are indicated by example. California is unique. Every effort must be made to force the expansion of the home aviation industry through developing new applications for the airplane. One such is the utilization of the airplane by a California mining company for transportation in connection with a mining project in Bonsai. Having found itself in possession of a valuable mining property some miles inland from the coast engineers reported that the cost of a road to the site of the proposed mine would be prohibitive. A study of the airplanes was made and it was found that by redesigning some of the mining machinery, and by properly selecting and equipping the planes for the job, that the mining operation could be economically conducted with airplanes as the only mode of transportation. This is but one example of specialized application of the plane to one branch of a great industry, among many great industries. It is fair to assume that if plane manufacturers would study the mining industry they could find many ways of serving

California, and the Kaiser Flying Club, organized by employees of the Kaiser Aluminum and Motor Corp. Glendale, although this plan is not entirely new it has certainly never been given the attention which it deserves. Every person who is earning his bread and butter through a connection with the aviation industry not only is personally interested in flying, but it is to his financial interest to see to it that flying is popularized. If every airplane factory, every aircraft engine factory, every large operator or distributor of aircraft, and every large company reasonably associated with aviation, made up the large oil and rubber companies would sponsor such flying clubs within their own organizations, we could see an overnight a hundred or so strong flying clubs. These clubs would give their members an active outlet for their enthusiasm for aviation, and would result in a nucleus around which private flying could be expanded. Each one hundred such clubs, with only twenty members each, would give us two thousand private flyers who could be easily converted into a sales force for the promotion of flying boats, and selling the idea of private flying to all of their friends and acquaintances. Unquestioned concern could well afford to make sacrifice in starting such clubs, furnishing materials at cost and arranging financing for the operations, possibly through a chartered lottery.

IN examining the aviation service industry California offers many examples of interesting application of the plane. Several amphibious planes have been placed in service operating between half a dozen near Los Angeles and water ports at Catalina Island, Bellows, Lake Arrowhead and other recreation resorts. A number of amphibians have been placed in service at Ferry bases around the San Joaquin, Sacramento and San Francisco Bay at San Francisco. These amphibious planes take off from land and alight on the water, but lower their wheels and run up board ramps to a dry platform for loading and unloading passengers. Such services have proved of great value to the cities served and offer a fine example of the airplane applied when it can best illustrate its own peculiar talents. There are other examples of special passenger and freight lines, which illustrate how every new and unusual development of airplane services expands the internal market for airplanes and gains increased acceptance of the plane among business leaders and the public at large.

For the "private market" which the manufacturer must continually develop we can only plead for a continued holding of foundations and ground work upon which the future private market may be expanded. Aviation country clubs and organized flying by women are two activities which manufacturers may well subsidize in an attempt to develop the private market. It is hardly necessary to point out that such an activity will provide a limited paying market for private planes, and will do much to insure general acceptance of the airplane for private pleasure and sport flying.

Another plus of even greater significance is that of the flying club organized among the employees of companies engaged in aviation activities. Two examples of such clubs are found in the Shell Flying Club organized among employees of the Shell Oil Company of

California, and the Kaiser Flying Club, organized by employees of the Kaiser Aluminum and Motor Corp. Glendale. Although this plan is not entirely new it has certainly never been given the attention which it deserves. Every person who is earning his bread and butter through a connection with the aviation industry not only is personally interested in flying, but it is to his financial interest to see to it that flying is popularized. If every airplane factory, every aircraft engine factory, every large operator or distributor of aircraft, and every large company reasonably associated with aviation, made up the large oil and rubber companies would sponsor such flying clubs within their own organizations, we could see an overnight a hundred or so strong flying clubs. These clubs would give their members an active outlet for their enthusiasm for aviation, and would result in a nucleus around which private flying could be expanded. Each one hundred such clubs, with only twenty members each, would give us two thousand private flyers who could be easily converted into a sales force for the promotion of flying boats, and selling the idea of private flying to all of their friends and acquaintances. Unquestioned concern could well afford to make sacrifice in starting such clubs, furnishing materials at cost and arranging financing for the operations, possibly through a chartered lottery.

THREE METHODS outlined above by which the internal market, the business market, and the private market might be expanded, constitutes California's contribution plan for representing merchandising methods. Of more vital importance is the major situation as exhibited by conditions in the Southwest, which calls for fewer and stronger factories, finer and stronger distribution, a scientific campaign controlled by the manufacturers with heavy financial backing, and the provision of a financial and industrial background of an independent nature for both manufacturers and distributing organizations. Finally, there are already markets well open and expandable of themselves, and there are others, but there is little probability of recovering markets from steel and manufacturer and sales for several years to come.

Returning to the second place of the Western market, as mentioned in the introduction to this discussion, we may well devote more attention to the possibilities for early sales in the California and Pacific Coast market, for as nearer home the aviation industry may conduct its future operations, these are at present many airplanes yet unused. Offhand, the California market might be considered a prime field for new plane sales in view of the high rate of migration which has reached there as early as 1928. This view would be supported by the fact that the used planes are selling well while new plane sales are at a standstill, and also by the fact that registered sales were registered in California during 1928 than 1929. However there are two opposite viewpoints to be considered. Replacement sales must constitute at an active pace in a territory where large manu-



Douglas on private property near Santa Ana, Calif.

bers of aircraft are being subjected to steady use. Also, the early saturation of the Pasadena market has resulted in wide usage of the plane on the Pacific Coast, and due to the timidity in the present market for even airplane properly used is continually sold two more planes, it is logical to anticipate a substantial secondary market among persons who are actually connected with the industry or who have not as yet been so connected.

To set any definite figure as the future California market would be likely to yield to producer or distributor the number of eggs that's been caught by. The only logical procedure is to study the bird's game performances, give her the proper attention, and let nature make its course.

SUMMING up the performance of the Western and Southwestern the market, from the standpoint of sales to the general public, which sales will depend upon the relative attractiveness of the persons in competing territories, an analysis of Census figures against aircraft registrations shows that California, although eighth state in population, has a total of more planes than any other state, and has practically double the number of planes of any other state excepting New York. On a per capita basis California has 2.12 times as many planes per person as the next best state, Missouri; 3.11 times as many as the most populous state, New York; 3.28 times as many as the average of the eight most populous states; and 3.62 times as many planes per person as the average for the entire United States. On this basis it would appear that the far western territory is approximately four times as well sold on the airplane as the country at large. Since there are 2,804,373 planes in every place in California it is evident that there is still room for improvement. However, accepting the proposition that the Western market is four times as active in the country at large it seems logical that four times the sales effort should be expended there in an attempt to tap advantage of the evident willingness to accept the airplane.

So far as the machinery for this sales effort is concerned, there are two important phases to be considered. California is particularly well organized for automobile travel and for air travel. There are many large distributors of automotive products who might be said to be interested in advertising in a direct connection with a strong airplane manufacturer. Under such arrangements there would be placed at the disposal of the aircraft sales program a thoroughly organized sales and service organization, which could adequately handle aircraft at a lesser overhead cost than can any independent distributor. This hook-up with strong automotive interests has not yet been generally effected in this territory. Far sales headquarters the personnel parts of the major airlines offer splendid facilities. Large hangars, perfect runways, and a complete staff for handling field operations and the general public are all available at such fields as Goldfield Airport, Los Angeles Airport, Grand Central Air Terminal, Glendale, United Airport, Burbank, Los Angeles Metropolitan Airport, Van Nuys, Clover Field, Santa Monica, Aero Corporation Airport, Los Angeles, and other well-established fields, growing at the same and service headquarters on each side is a sensible move, rather than for the individual distributor to attempt to operate his own serial service company, school, and charter business as a means of carrying out his sales and marketing to his sales area.

In conclusion we may state that the trend of the market in the West indicates the continuance of a limited national market for practically all types of planes, with most sales to be made in the Southern West, and with the less activity still on the coast. There is no indication here of an early expansion of the private market, and the only hope for great expansion of markets is general fits in extensive pioneering work by very large groups which can afford to sacrifice profits for several years to come while building for the future.

As to the market for new planes, considering that

there is such a market, even though limited, the fact that most buying of planes is still done by or through planes, or upon their recommendation, may well be borne in mind. California, with double the number of pilots of any other state presents a concentrated market with twice the theoretical buying power of any other like portion of the country.

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WHAT IS THE MATTER WITH OUR

Advertising?

By JOHN HENRY KUNKEL
General Manager, The Eddy Company

THE QUESTION asked by the title of this article is not an academic one. These very words have been uttered verbatim by practically every executive of every company in every industry at some point or another during his career.

Since the aviation industry is beginning to advertise in a big way, it may not be amiss to ask that question of ourselves without applying it to the advertising of any one company in particular, but to aviation advertising in a whole.

The writer does not believe that the enormous sales value of advertising is being extracted by aviation companies whose advertising is appearing today. These companies are not good. Neither are they bad. They are mediocre and therefore less than fair.

A survey of our current campaign reveals a tendency in advertising to use the sale of advertising rather than to advertise the sales. We are advertising because we either feel it is a necessary tool or the reverse we feel it is the simplest thing to do.

This is not the fault of advertising managers. It is not the fault of advertising agencies. It is not the fault of the executives of airplane companies. The reason is found in the fact that the entire corpus of our aircraft companies have been concentrated on the problem of financing and developing production. Advertising has had to take second place. It had to carry its own tray and get along as best it could.

The time has come, however, when this situation must change.

The aviation industry faces a major problem more difficult than financing and production. It must develop a market for sermons to absorb the production we have so laboriously developed in order to produce dividends

to satisfy stockholders whose money has made that production possible.

Advertising now becomes a definite sales factor. It is the force which must be depended upon solely to create this needed market. It must pave the way for airplane salesmen. It must soften the hearts and open the purse strings of hard-hold buyers who must be changed in their attitude from highly skeptical and half-reluctant to an attitude that is open and receptive. It must banish down all preconceived negative ideas in the minds of prospective prospects, and replace them with ideas that are favorable.

AIRCRAFT advertising has been declining in grandeur. But for the purpose of illustration, let us review the type of airplane advertising that has been appearing in leading business magazines. It is better suited, obviously, for the purpose of illustrating the executives of leading industrial and commercial organizations in the purchase of airplanes and the application of the airplane to the furtherance of their respective businesses.

In the title of many of these ads we hold our executive-readers something like this: "Your Sales Manager Can Travel From Oshkosh to Walla Walla in Less Time by Air." The copywriter picks up the same suggestion in the title and proceeds to follow the theme. After the reader-executive has finished reading the advertisement he knows nothing more than he expected before he ever saw the advertisement. He knows his sales manager can fly from point to point faster by air. The advertisement sold him nothing. This suggests a solution to our problem.

Advertising must come to "advertise." It must *Sell* Copy and talk gas no longer deal in grandfathers or

The well known adage about building a mouse-trap and living in the woods, may have held true in Emerson's day, but twentieth century business success requires not only quality goods but quality advertising.

Living. "In Mr. Kunkel's opinion aeronautical advertising is far below par, and in this article he relates of its present ills, and of the important part that it can play in boasting aeronautical sales volume.

more complete. Advertisements must begin to deal with *Facts*!

In preparing our advertisements let us consider our audience. Again for illustration purposes let us consider the industrial-commercial market. Our audience is composed of executives. They have an interest in aviation. All seek ways and means of increasing the operating efficiency of their companies and thereby increasing their revenue.

The airplane manufacturer who first breeds an advertising campaign that shows in figures and in facts how the industrial and commercial users of air planes are increasing efficiency and profits will accomplish much in preparing for his audience's list, for larger work he has to sell now.

To be specific, that campaign will show in a series of advertisements how an oil company is using airplanes to its profit. Another advertisement will show how a mining company has applied the airplane to its particular needs to the end that operating efficiency has been raised. Another advertisement in the series will tell how a Pacific Coast department store buyer, poling the latest Paris fashions right from the sweater docks in New York and down them to the coast for display and advantage sake before competitors were able to get them ready for rail shipment. One such advertisement will tell how a sales manager swings around the territory just before a big sales manager visits, and through contact with his sales force can add to success the whole-hearted co-operation of his selling force to the end that salesmen were seconded during the campaign than ever before.

ONCE AGAIN no manufacturer should expect his advertising to stand on its own feet, alone, but should back his advertising campaigns with well directed sales efforts. When an advertisement, or series of advertisements, is directed to the use of the plane by oil companies the sales department should back up this advertising with a strong drive on all oil companies, and similar oil induced industries.

By co-ordinating dealer effort, factory sales plans, and the general advertising campaign, it becomes easier to extract the maximum advantage from advertising. If advertising is to sell, at this time, when two-fifths selling is so hardly needed, then it must be accelerated and intensified as a sales tool of the most powerful sort, rather than as the necessary evil which it has been so mistakenly considered by many up to the present time. Advertising is the most powerful of all sales methods, and it must be used intelligently as such.



An example of illiterate advertising of a construction automobile and airplane interests.

out with the fact that the Martin Valve Manufacturing Company is using the advertiser's airplane and Oscar Martin, president of the company says that as we has produced a profit. He should play that up for it is worth the north, and if it is done right it will be worth a great deal!

If the advertisement deals with how an oil company is using its plane, or fleet of planes to the end that they have proved profitable then the plane manufacturer should lay off advertisement in literature on tire, and in text to appeal to the executives of other oil companies who may need the ad. However, after that is done, the master should not be permitted to rest there. If the airplane manufacturer has definitely proved that his plane is a profit producer to one particular type of manufacturing concern, he should get the idea to other executives that those of this particular industry that benefit the airplane has proved a good investment for the "William Petroleum Corporation" it can prove an equally sound investment to other industries in other lines. Such suggestions in an advertisement should be strongly backed by the suggestion that the executive interested write to the manufacturer to find out how this can be done! Then it is possible to open up a tremendously effective direct mail campaign upon the strength of recent publications advertising.

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STATISTICAL SOURCES FOR *Market Analysis*

Concerning Available Statistics and Their Value to Aero Sales

By FOWLER W. BARKER
*Director of Sales, Aeromotor Trucks, Inc.
Division of Flying and Marine Commerce*

THIS MERCHANTISING PROBLEM before the aeronautics industry today is not merely that of getting began and sellers together. In the past, those who wanted to fly, and had the money, investigated different aircraft, spent a lot of time around airports, and supply bought the airplane their judgment dictated as best for their uses. The problem now is to find more persons who can be cultivated and developed up to the point of purchasing.

We have heard of numerous new and elaborate sales programs, but has the industry thought enough about market research? It is true that there have been numerous factual analysis of the aircraft market. Trade publications, national magazines of general scope, and advertising agencies have accomplished some cooperation and worthwhile surveys. It is not believed however, that these are being used to best advantage by the managers in the aeronautics industry. Their thoughts apparently are confined largely to aeronautics divisions, publicity-building flights, and editorial advertising.

Two classes of statistics are available to the aeronautics industry in analyzing its market: First, those dealing with aeronautics exclusively; and second, those dealing with general business and economic facts. The first class of data are being used, but, it is believed, not advantageously by the majority of sales managers. These are useful for purposes of determining the best basis of the market as well as its current condition. The second class of facts is useful in determining what action to take in order to obtain desired business.

These data are not always easy with relationships problems, and most of them rely very much from statistical data. This carries the sales manager who has turned to his association publications and advertising agencies have contained many interesting facts—but he must see that these will help sales volume. The data usually goes to the firm for reference when the sales manager has plans but, in most cases, he never finds time. It must be said for him that the surveys do not go in the waste basket although they might just as well for all the planned use that is made of them. Older industries recognize the need for scientific market analysis. They hire specialists for this work and find that it pays.

One fact stands out in surveying the field of market

statistics, there are better data upon which to gauge the present and recent financial market for aircraft than there are for any other product. This was a broad statement but it is believed to be an absolute fact. What aircraft has facts so readily available to it as the following: names and addresses of purchasers; resale value and type of product purchased; year in which product was produced, length of time before distributor or dealers resell a specific product; and names and addresses of persons at present qualified to make direct use of and to maintain the product?

The aeronautics industry has these data readily available in the form of the quarterly (conservative) and weekly (current) registration lists compiled and disseminated by the Washington Bureau of Aeronautics Chamber of Commerce from Aeronautics Board records. It is apparent from the large demand for the service that the industry is using this valuable information. It may also be believed to be for purposes of discrediting aeronautics writers, photo and magazine with anti-propaganda. Other uses are being overlooked.

THE Aeronautics Chamber of Commerce is now observing from its circulars complete lists of distributors and dealers as far as the first four or five years figure of planes owned by private users may be segregated from those used by other types of operators. Air and contractors are known. So are the schools and clubs and, if not the name of the registrants identifies the operation for which the airplane is used. By elimination we can arrive at the figure for private owners. This is an obviously important factor and to date, although many estimations have been made, no one has taken the initiative to measure this figure from the mass of data in which it is contained.

Thanks to "Ray" Cooper and the "Detroit Aviation Directory," published by the Detroit Bureau of that city, we have a list of distributors, dealers and air and marine operators in Michigan. As a sample of what can be accomplished with the strength represented in Michigan, in the Aeronautics Board-Aeronautics Chamber of Commerce compilation for May 15, 1939, in conjunction with Mr. Cooper's director, we find the following:

Of the 474 licensed and unlicensed aircraft registered

In Michigan 224 or 47 per cent were privately owned, 70 or 15 per cent were in the hands of distributors and dealers; 33 or 12 per cent in the hands of manufacturers; 17 or about 4 per cent being used as educational resources; 21 or about 4 per cent by non-governmental organizations; and 61 or about 17 per cent by schools, clubs and other types of Saled base operators. The remaining 25 aircraft consisted of 21 gliders and 4 balloons which according to the state law must be glass-enclosed identification balloons.

There are many other break down which members of the industry can work out. For example, old war surplus aircraft can be segregated from others listed under "Identified"; the year of production is given so that one can break down the registrations by the relative age of the planes.

THOSE are believed to be very enlightening figures. The percentage of private assets is surprising also the number of plates in the hands of distributors, dealers and manufacturers. That Michigan has more plates used by non-commercial organizations than by air-transport operators is interesting to say the least. It is difficult, of course, to appraise aircraft as to those "on hand" for sale by dealers and distributors and those being held by these organizations in their own operations. We have used the method of considering the type, model and yearly model of plane, whether it is a sail, ease, or a biplane which the particular dealer or distributor is listed as representing. Persons experienced with commercial aviation can determine with reasonable accuracy from names of organizations and apparatus registered, what state of organization is being considered.

The quarterly cumulative lists of aircraft registrations could also be used in determining planes unused and in the hands of manufacturers, if the manufacturers would follow rigidly the policy of identifying aircraft when completed. There is no legal requirement in this connection. If the industry should agree on a policy of not withholding "delegations," these would also be thus ascertainable as to their ownership or surplus.

We also have a list of distributors and dealers in Oregon obtained for this article by radio through the courtesy of James Bartholemew, acting manager of the Portland Office of the Bureau of Foreign and Domestic Commerce. This shows that of the 113 places both listed and identified, in Oregon on Jan. 15, 1938, 56 or 48 per cent were privately owned; 27 or 24 per cent in the hands of distributors and dealers; 4 or 4 per cent experimental benzene plants in the hands of manufacturers; 3 or 3 per cent being used on scheduled air routes; 3 or 3 per cent by non-airline business organizations; and 30 or 18 per cent by schools, clubs and other fixed base operation. The remaining two aircraft were gliders which have identification numbers.

Here is a state, principally agricultural, which with Michigan, as industrial state, is a representative market. Compare the breakdown for Oregon with that of Michigan. We find a smaller proportion of industrial users, a slightly larger percentage of privately-owned planes and other valuable comparisons.

Using Oregon's weekly registrations as a test case on distributor and dealer turnover, the January 15 total registrations show 49 licensed aircraft and 64 identified. The January 25 weekly release shows an increase (change in ownership) of an ORX job of well-known make. As the Department of Commerce numbers of the planes do not change, nonetheless a change in ownership

ship, that number on the January 15 cumulative bill can be referred to for the purpose of determining who sold the plane. It was not a 550 mentioned in our memo. Furthermore it was the state distributor or in a local dealer or that made of plane. The name of the new owner is not listed in the dealer and distributor compilation. As we cannot identify him as an amateur operator for business, we can assume that he is to a private owner. We have checked with the State Department of Aviation. Furthermore, he is a student pilot on the world list of January 18, 1930. We know conclusively that another private owner has been sold the field. We know who sold him the plane. If we wanted to take the trouble we could trace that back to the time it got into the hands of the last seller, but it is a 1927 model so we will not bother. The plane may have changed hands several times. If we could find out where it was registered we would know the factory it was manufactured at. We could also find out where it had remained on the manufacturer's hands before he let it go, presumably on the *transatlantica* hands before he left it.

Many facts can be worked out from these workbooks. They are being improved. Since January 15 new alone figures are indicated by asterisks. The January 15 issue, by the way, includes data taken into consideration by Paul Breitling's list of the Washington Bureau of the Aeronautical Chamber of Commerce that the "Licenser" lists are brought up-to-date quarterly, "Licensed Mechanics," "Licensed and Identified Aircrafts" and "Licensed Pilots" being released on alternate months, the last issue being December 15, January 15, February 15, March 15, April 15, May 15, June 15, July 15, August 15, September 15, October 15, November 15, December 15, January 15, February 15, respectively. The weekly lists containing current registrations of aircraft, pilots, mechanics are dated and released on Saturday of each week. Accordingly, additions and changes for aircraft on the list of "Aircraft, Pilots and Mechanics Licensed" during the week of January 15, are covered by the January 15th cumulative list.

STERNTHALE, the Aeromaritime Charter deserves a great amount of credit for making available to its industry the most complete and valuable data to be had in any group in any industry. The Aeromaritime Branch can be set up without hindrance, as the Aeromaritime Trade Division, although operating closely with that branch of the Commerce Department is not a part of this division being under the Bureau of Foreign and Domestic Commerce) deserves credit and a large amount of broadminded attitude in allowing the Charter to compile and disseminate the facts from its records. Freely several publications compiled these data independently and some discrepancies occurred in their respective releases with resulting confusion. The Aeromaritime Charter or Commerce goes to the information quickly if it is available to anyone. Should the Aeromaritime Branch endeavor to honor the job itself it would require a special appropriation and unavoidable delay in operation.

Another improvement in the service is that starting with the weekly list for the week ending February 8 the names of the deceased former owners of licensed or identified aircraft are included. This facilitates the necessity of looking up the name in the cumulative list as was necessary in the aforementioned test case. There are several supplemental services in connection with these registration lists. A private statistical service starting with January this year breaks the aircraft Sales down by number of planes, by states, in a manner

similar to the same services "break down" of automobile registrations. As some manufacturers have different types of plates i.e., state, license and cabin monoplans, that compilation, if further broken down by types, would be of greater value. The Aeronautical Chamber has released in micrographed form a "break down" of licensed aircraft by types, by states, as of Jan. 15, 1930. Now what we need, and what the Chamber is going to make available, is the above-mentioned types of publications for the whole country as has been done here for Michigan and Oregon.

Some individual whose mind runs along statistical lines will devise a simple system for compiling and keeping down these valuable data so give one who is selling already everything he would like to have from them at his finger tips. The basic data is available. The resulting work should be simple and not too scientific or complicated.

Now as to the second class of statistics. The first as stated before deals wholly with *surveys*. We have discussed the most valuable. What can be done about utilizing more of the lagman and not wasting effort on those who are already sold? We have given up to dry old statistics for guidance and there are plenty of them. Fortunately someone has poured over them and consolidated in one volume some of the most pertinent figures for the market analyst no matter what line of merchandise he is interested in selling.

IT IS REMARKABLE that an anomaly that practically no aeronautics sales managers or, in fact, few individuals in the industry have taken the trouble to survey the "Market Data Handbook of the United States." Upon its release from the Government Printing Office last fall, it was especially directed to the attention of the aviation industry by the Aeronautics Trade Bureau through the local offices of the Bureau. To our knowledge, not many of these publications have been used to this point; which, perhaps needs more careful thinking.

The Department of Commerce is not in the business of selling books, and, in fact, it is unnecessary to buy one as it may be referred to at any of the 31 district offices of the Bureau located throughout the country. This work is believed to be of value in gauging the future aerospace market; in determining where to place advertising; in better allocating, as opposed to the haphazard allocations, of distributor and dealer territories; and in establishing sales quotas for our more important industries, from the standpoint of the potentialities of the aerospace market. The data contained in this Handbook, as determined by the fact that it is now in its third edition, totals over 4,000 copies each having been completely exhausted within two months of initial release. The author, Paul W. Stewart, of the Department of Commerce worked for two years, with a staff of assistants and with the cooperation of various national advertising agencies in preparing it. As a result he was recently awarded the Gold medal for his contribution to American advertising in 1959.

With regard to the *Handbook* there are three general types of analysts concerned—the general consumer, the industrial and the farm—all very definitely fitting into the agricultural picture, although the last mentioned has not been seriously considered by our industry. The 3,688 counties of the United States are used as units for purposes of market measurement. These, together with

maps are included as supplements to the Handbook, two of which present both the wholesale and retail angles of the industry. One map concerning operating terminals and pipelines shows 80 major trading areas, while another in some instances lists secondary areas making 137 for the entire country. The 50 major trading areas, which do not take state boundaries into consideration but rather economic divisions, may be used as distributor or liaison branch territories and the smaller areas for salesmen and dealers.

This largely statistical work contains the following data, by states with breakdown by counties, all of which have a direct application to the market for aeronautic products: population (urban, rural and number of families); value of agricultural production; value of mining; hard deposits (earth savings separate from taxes); postal receipts; number of individual income tax returns; passenger automobile; audited circulation of 13 national magazines, and various classes of newspapers; and number of trade papers, mail and whole-

THE PURCHASER applies in the consumer market, in other words the "private owner". We can imagine the aeronautical salesman or his boss asking, "What practical use can be made of this issue of data?" Brady, they will tell you where the people are in the country who have the means to purchase aircraft. The sales manager, if he already has a distributor in a territory which shows up well in light of these statistics, can let the latter a lot about the territory that the representative does not know, and why more sales should be made. If there is a representative in the particular territory steps should

A smile in the book showing the production of the various fishing grounds in the country would ordinarily be a wise, well-considered thought. It should direct attention to a more important subject, namely, the transportation of fish inland. The wharf and farm markets covered similarly, in so far as detail is concerned, in the manner outlined for the *cooperative trade*. The Handbook also contains a bibliography on related research. Some of the publications listed contain specific guidance in determining sales quota, some attempt to apply practically the theory of market analysis, and others are merely statistical.

There are of course other estimates of values in aircraft market analysis which because of limited space cannot be mentioned in this article. When the 1936 census is completed a break down of population between 16 and 45 years of age might indicate, with a database of perhaps 13 per cent for those not physically qualified to fly, the number of potential planes to fly privately themselves. One further unpublished indicator mentioned by the American Bureau of Census may be taken as an indication that the industry is not restricted for overproducing and for having a more distribution method. As something favorable to be said first. According to the National Automobile Chamber of Commerce list 3,083 passenger automobiles valued at over \$4,000 were produced in United States factories during 1929. In the same year 6,034 aircraft are an average valuation of well over \$5,000 were produced. By means of instead of high priced auto rentals, based upon thorough analysis of the market, the industry should reach out and develop the three classes of potential customers—individual, industrial—and do not

THE *Parts Distributor* AND HIS DEALERS

By EDWIN G. THOMPSON
President, Vinton Aircraft Corporation

THREE IS an old axiom which states: "A chain is no stronger than its weakest link." Since there is such a close intimacy of purpose between the manufacturer, distributor and dealer, it may justly be said that a manufacturer is no stronger than his weakest distributor, and that the latter is no stronger than his weakest dealer. Thus, the success of such depends upon the success of all. Therefore, it behoves the manufacturer to make his distribution organization as strong as possible, and the distributor to exert every effort to keep his dealer up-to-date in his particular field.

One of the foremost interest and re-establishing the fact that the purpose of this article is to deal primarily with the aids distributors of aircraft engine and parts should give their dealers, it might well be outline briefly here the help manufacturers of such products should give their distributors.

It is generally acknowledged that the manufacturer has a more profound knowledge of his product than any of his distributors. This is due to the fact that the latter may be acting as the sales experts for a number of various firms. Consequently, it is more important that the manufacturer lend every effort to see that his distributor and their salesmen possess as thorough knowledge of his product as possible.

The manufacturer should, in many cases, train his distributor's salesmen. If an engine builder, he should train them so that they will be able to provide the distributor with the methods of carrying his products, in view that his engines are properly protected by adequate service facilities. He should supervise or provide his distributor's advertising, and it is part of his duty to perform in general any other specific duties of the distributor.

Now we come to the function of a distributor as applied to the aids he should give his dealers. It is difficult to differentiate between the importance of the numerous functions of a distributor, but perhaps the most essential duty is keeping his dealers informed of new developments in the products they are handling.

We believe that the aid for keeping our dealers cognizant of new developments and improvements is one of the distributor's most important functions because of the constant product changes and refinements that are being made from day to day, by aero manufacturers.

Many aircraft engine manufacturers have found that, no matter how many "logs" they are able to discover and circulate through blackbooks and test flights, there are always countless others which are not found until the



EDWIN G. THOMPSON

engines have been placed in production and are giving actual service on air mail and planes. Also, because competition in the engine field is extremely keen at present, all manufacturers are constantly working to perfect their engines.

Thus, it can be seen that an engine which is apparently in its ultimate form today, may be used tomorrow, by finding in some of the refinements contained in an engine of the same type, which came off the same assembly at a later date.

JUST RECENTLY our company received notice from the home office of an engine builder, for whom we are distributor, stating that they had developed an improved part for the rocker-arm of one of their engines. This type of power plant has been in production and delivering daily service on many planes throughout the country for over a year. Yet the manufacturer requested that we have this change made on all engines of this particular type that were on our shop or those of our dealers for overhaul, in the future.

This is just one of many similar instances. In each case it is essential, of course, that we acquire an adequate supply of the new parts, advise your dealers immediately of the representation and see that they, too, stock up on these parts.

Very often the manufacturer may develop new tools to facilitate the servicing and overhauling of his engines.

Or the distributor, in his own shop, may work out more efficient tools or methods for performing various jobs. Such knowledge and aids should be given to the dealers as promptly as possible.

Following next in importance among the aids a distributor should give his dealer are manufacturing helps and suggestions. In the aviation industry, the outlet for such products as airplane engines and parts is not of sufficient volume to permit the distributor to function with inventories analogous to distributions for similar products in other industries. Consequently, the distributor's inventories are high, the sales are slow, and the turnover low. The distributor who turns his inventory over twice a year, assuming he maintains a sufficient stock to serve his territory, may be said to be doing an excellent business. However, to operate on a more economic basis and receive a return from his investment commensurate with that of other firms which he might handle, the distributor should be enabled to turn his stock over four or five times a year.

At present discounts on accessories, supplies and engine parts are too small. These rates are set up by the manufacturer in most instances. The reason for the small rates revolves around the old economic principle of supply and demand.

The solution to the problem of small margins and low discount rates is, of course, to create a larger sales volume through a well-organized distributor and dealer organization. However, during this period through which we are passing, with discount rates lower than those in other industries, the responsibility of correcting this condition lies with the manufacturer.

Notwithstanding the above mentioned fact, it is up to

No matter how fine the quality of his product may be the progressive aircraft engine manufacturer should establish a parts and service organization so that his customers may be assured of maximum value for money expended. The keynotes of such an organization are the distributors. They are responsible to the manufacturer for the activities of the dealers, and it is the dealer who actually contacts the man who originally placed his signature on the dotted line of the manufacturer's sales contract. In the accompanying article Mr. Thompson discusses from an authoritative point of view, the responsibilities of the parts distributor and the various methods to be followed in building up a profitable dealer organization.

the distributor to do what he can to build sales and endeavor to show the manufacturer that the conditions should be remedied. It is necessary, too, that he give his dealers all the assistance they require in acting their service and parts.

The distributor's salesman should work with his dealers' salesman. The former should accompany the latter on various calls whenever the occasion warrants. Through



The sales room of a parts distributor's depot. Note case display of parts

this system the distributor may observe and correct the sales methods of his dealers. By this procedure, too, he can help select the real prospect and sell them more thoroughly than would otherwise be possible.

THE SAME PROPRIETOR is extremely complex because of the scattered and located registration of prospective customers. This condition will hold true until the Aviation public, as a whole, becomes accustomed to the extent that they adapt the airplane to their business or personal use so the manufacturer is quite important that a sales and educational campaign be carried on at the same time. And sales and educational programs can be best carried out in the personal contact work of salesmen which is turn is dependent upon advertising and selling.

We have found in our own industry that a properly conducted direct mail campaign is the best type of advertising for selling services and parts, although it is used in with trade journal advertising. Our publicity for direct mail advertising is due to the fact that, as in the case with most distributors and dealers, the territory we serve is broad. Because of this there are few, if any, publications which offer a complete coverage of our market without a great waste. Therefore, the logical type of advertising for a dealer is direct mail. And, remember, as few dealers are equipped to prepare such literature, it is the duty of the distributor to assume or supervise this work.

As has been mentioned before, we the one direct mail advertising in with advertisements in several of the better trade magazines. This latter type of advertising, while essential in our case, is undoubtedly too expensive for the smaller dealer. However, in instances where the dealer is going after a large transient business, it is well to use such medium. In all instances the distributor when making a sales call on the dealer should make the right and, in fact, make it a point to supervise all of the dealer's advertising. This is merely in line with the general procedure followed by most manufacturers in choosing the type and tone of advertising which the distributor should employ.

Now we come to the duty of the distributor in the matter of fulfilling his function as a source of supply for his dealers. Theoretically, the distributor occupies the same position in relation to a manufacturer as a

factory branch and, as such, he should be properly located geographically to best serve his dealers. He should be situated as near the center of his territory as possible or should have a complete inventory of stock at such a point. Only in this way can he give his dealers the prompt and speedy delivery they often desire.

Also, in appointing his dealers, the distributor should endeavor to have them located at the most strategic points (geographical) in order that they, too, will be in the best possible position to serve the widely scattered owners and operators. In other words, the dealers, whose duty it is to function as a branch of the distributor's service, should make these facilities available to the individual user and operator as promptly as may be possible.

The majority of users of airplanes are scattered in small houses over a wide territory. Consequently, it is necessary for the distributor to have a well planned, prompt and efficient dealers' organization, to render adequate service.

THIS BRINGS US to the question of stock. We have just stated that a distributor should be centrally located in his territory to expedite deliveries. For the same reason he should carry on hand at all times a full complement of parts and supplies to supplement the skeleton stock the dealers are required to maintain.

It is not only a question of selling the dealer his initial order of stock, but it is equally important that he be given help in keeping his stock properly inventoried in order that he may in turn render proper service in his territory. In many instances it is advisable for the distributor to assist his dealer in setting up a card, or some other system whereby they can keep an accurate check on their stock.

It is essential, too, that the distributor give every possible aid in keeping his dealers' stock of parts for cleaning, or gear-revision, repairs at low or possibly no cost that they will not find themselves with large sums tied up in unusable parts, on their hands. To this end the distributor must be able to give technical advice and assistance. The problem also goes back to the need for keeping dealers informed of all new developments and refinements which we previously mentioned.

From the points we have outlined, it is clearly apparent that a distributor must be a specialist and a jack-of-all-trades at the same time.

While still operating directly with the manufacturer, but serving more directly through his dealer organization, he must have a sound knowledge of the dealers' problems from every angle. He must have an authoritative knowledge of engine overhaul, which will enable him to render expert technical advice whenever called upon. He must be in a position to give merchandising helps and suggestions. He should be able to assist in formulating efficient inventory and stock accounting systems. And he should be capable and ready at all times to supplement his dealers' services and render any aid necessary.



A view of the parts stock room in a service bureau

MERCHANDISING BEGINS IN



the Drafting Room

By JOHN F. HARDECKER

drawn, and consider it in the light of how anyone—anywhere—might operate and service it. It isn't enough to feel that to do a certain thing or not do it isn't easy; one must—it's his job to make the doing of the right thing easy, and the wrong thing impossible.

This implies fundamentally a more intensive study of materials and tolerances. Use of swiveling in the shop is certainly a point in favor of any given material, but when that advantage carries with it a consequent wear on the softer material in operation that becomes relevant, that it is no longer an advantage from the mere merchandising angle. Weight saving is of primary consideration, but if light alloy fuel lines will not stand up as well as the copper lines in aerial power plant operation, then the weight saving must be logically forgotten. Standard bolts are another advantage, but if they introduce play in a hinge point which breeds excessive wear on the bearing surfaces, then it is a true merchandise necessity. Ball bearing mounted pivots obviously cost more, but if they introduce operational ease and greater life, the designer should specify them regardless.

The designer or draftsman once and for all must forget about what he would do with his prototype—with all his pride of creation and intricate export knowledge of

the art of his profession.

At first glance the title of this article might appear to be a bit far-fetched. Yet, as Mr. Hardecker points out . . . "there is a tangible relationship, and many a real merchandising problem is usually born on the drafting board." "In support

of his opinion Mr. Hardecker writes of several merchandising "errors" that can be traced to the drafting board. Individually, they are of no consequence whatever, but collectively they can very easily prove to be a most serious hindrance.

When an organization buys in sufficiently large quantities, and uses aviation activities are rapidly approaching that position, special materials or special variations are

usable obtainable. Many times such specifications possess distinct technical advantages and many times also the advantages are purely traditional. It is well to thoroughly examine all such special material specifications, for while they may possess what at first appears to be highly desirable selling points, the operator who is down in an isolated section of the country can easily be looking for such refinements. He'll replace with whatever "looks like" the material in question from the nearest commercial source. And if he can't—well, there goes a black mark against that manufacturer.

A great deal can be gained by studying the commercial practice of the industry in which the material or part originates. It is easy to obtain special gauges or fixtures or even for ordinary commercial gauges to fail within the tolerances of some special gauges, but why comprehend the replacement problem unnecessarily? Most other products may be bought in almost any detail, but only purchase special parts if ordinary commercial parts will do. These seem obvious points, but it is surprising how often their omission seems in violation, for selection should with many materials and parts from many industries.

To call for certain standard parts whenever applicable is such an obvious advantage in merchandising and selling, that it seems almost insulting to mention it. At least the advantages are too obvious to bear repetition. Yet, there is still a prominent airplane manufacturer who buys his bolts and nuts to the old Army standard part numbers, although AN bolts and nuts have been reusable for our five years. Then there persists for a long time the airplane manufacturers who still use special terminal connections on their streamline wings, so that replacements could not be made with standard AN terminals, and special ones had to be purchased or manufactured. Special parts founded on sound engineering judgment are occasionally necessary in place of mass production methods. But in the majority of cases they are founded on some special predilection or intuition of the engineer. The real kick-back occurs when the business operator is forced to unwillingly enter to what he considers are refinements of the pur-

sonal regimen or draftsmanship, and real merchandising and selling effort is nullified thereby.

THIS MATTER of part numbering drawings appears with a single use, that seldom are the drawings to control manufacturing and servicing policies that limit them even inspected. Part numbers in the abstract are cheap, being really free for the asking of the record clerk, and so are often little respected in the drafting room. There is for example, the engine manufacturing organization which is furnishing complete detail drawings for each model, completely draws such separate man and design a new part number, so that in the mystery of various model assemblies, the same little insignificant numerical code may be camouflaged under five different part numbers. Think of the attitude of the poor stockkeeper who is always making such enlightening discoveries, and considering whether he can really trust his own observations. The reason for this is that the original designer never enters his name and prints out the required part from his bearing a totally different part number.

Then there is the matter of changes on drawings, and their effect on part numbers. Some manufacturers change part numbers rather glibly—the most insignificant change breeds a new part number for the part in question, often never change a part number, even though all interchangeability is lost on the change. Invariably due to actual failures in the original part. Servicing policy would appear to indicate that when changes are minor and interchangeability is maintained, that part numbers should remain unchanged for easy identification and utilization of replacement parts on hand, where the change is mandatory a new part number will serve endless confusion.

One of necessity for service and repair incorporated into the design in the drafting room, is replacement insurance for the manufacturer. After all, repeat orders are the truest measure and gratifying source of profit to any business, and making it easy to keep your product in good order insures opportunity for good human and self help. Take also a part requiring frequent inspection is made inaccessible and lubrication points are so inobtrusive and well hidden, that they escape notice.

The foregoing are not points which are brought forth as criticisms of those charged with engineering policies. Obviously, civil engineers would find little encouragement from major executives, who have the merchandising and servicing problem very much at heart. They are either detail points often decided by detail drawers or those engineers, which never reach executive attention. In the light of their present presentation, individually, the harm of single solutions may well be evaluated to area, but collectively, they total a serious and often undisclosed obstacle to successful merchandising.

SELLING Air Passenger TRANSPORTATION

*A Review of Air Transport's
Growth and What It Will
Offer the Traveling Public
Tomorrow*



By J. M. EATON
*United Traffic, Manager,
Pan American Airways, Inc.*

THAT there is interest in the development of aviation cannot be questioned. The spread of aviation covers the nation. The younger boys and girls from six up, the vacation sealer, the commercial traveler, the banker, the investor, skilled labor, the college man anxious for opportunity, the post office, the public in general and the traveling public who uses transportation as a means to an end, anxious to reach destination with the least delay. The insurance business man or woman realizes that any new industry must go through its "growing pains" during which time there will be periods of friction between uncertainty and suspicion, but sooner or later they are going to expect maturity and with it a steady down to dependable behavior. A business is like a child—naive, innocent, good, bad, and ugly, sensitive during which time people learn to make allowances for expect dependent behavior as immature approaches, or here we see the promising child is thrown out as no good.

Avention is no longer a child or a boy, but has reached its first stage of maturity. It was conceived back in 1185 A.D. when a subject of King Saladin invented a winged contraption with which he pretended to master

the laws of gravity. It was born in about 1500 when Leonardo da Vinci, that great artist and sculptor, architect and engineer as well as scientist, through thought and study of aerodynamics, advanced theories which convinced him of the feasibility to elevate and keep in the air a body heavier than the atmosphere. It was an infant named by Montgolfier Brothers, of France, Professor Charles, Jean, and Etienne, Lenoir, Pigeon, and by Dupre. The bird was made to take a step in 1663 by Wright Brothers, and since that time has crept, taken many steps, walked, sprouted, and qualified on the timeline. Contributions to advancement were made in rapid succession by men who became in aviation up to the point where a diploma was awarded when Col. Charles A. Lindbergh was the world on fire in May 1927.

We now come face to face with the major—"aviation"—who must select a vocation and determine what methods he will follow to make it a success. Based on the knowledge which he has accumulated during the great number of years since his conception and the wonderful



General view of a modern aircraft factory during World War II.

Modern four-engine bombers to be built for Pan American Airways



opportunity of using whole hemispheres discovered, unless much heat, stress, density and gasoline economies developed, he needs no one to remind him that in order to be successful he must prove his worth by merit and not depend on that so-called "sharpy good appeal," which is a sound comedy expression meaning an attraction based on a quick passing fancy precipitated by sympathy or a shallow romantic appeal toward an individual effort satisfying a temporary desire. He knows that success is based on dependability, regularity, comfort, attractiveness, safety, economic value and financial responsibility.

He has chosen transportation as his vocation and has adopted merit as the keynote of his policy in handling passengers, mail and express.

Most of us know what the transoceanic is, or perhaps a better example, what the jitneys are or were. However, only few realize what the jitneys were when they first appeared on our streets. It took but a few and events to show that they were not a dependable method of transportation and shortly a lot of independently owned automobiles got into operation under a policy which was based on a romantic appeal and was successful. Aviation started off during its immature period more as the jitney and relied on the sentimental theory giving appeal which was quick passing, than relied for new popularity based on a romantic appeal of certain technological effort with the result that a precarious situation was created. It would now apply the following formula to itself:

1. Is there a need for fast transportation?
2. Will air transportation displace land or seafarers other forms of transportation?
3. Is it best adapted for short haul or long haul?
4. Is it able to stand intensive competition from other forms of transportation?
5. Is it best suited for fast food?
6. What is it adapted for—commerce, business, or both?

The answer is, there is need for fast transportation; but the air efforts the best means that best results can be obtained over the longest distance (at least, for the present) where airports are located not far from the centers of population and where short distances are served with fast established ground transportation; that the greater percentage of revenue will be derived from other lines for the next five years in that it will be used primarily for business travel in this country until more commercial flying equipment is developed (Europe and a few spots in this country being the exception where seasonal tourist travel takes it up for one reason or another).

AS TRANSPORTATION is just like any other business in that it is dependent on its size for its revenue in the case with the manufacturer of radio, electric refrigeration, candy, cigarettes, etc., except that it is a service instead of a physical commodity, and requires a greater combination of details. The thing to be sold is intangible, something you can't take home with you, only a remembrance of something you found useful when you wanted it and expect that it will be the same or better when you want it again; something you take on particular lines in (because it's not yours), something you can be conveniently provided with if it doesn't please, some-

thing that is dependent on repetition and good will for its existence—in other words, it's a frame of mind; psychology has a big part to play in the success of ground transportation and is going to play even a bigger part in the selling of air travel. The company, or companies, that allow the same mechanized planes of the aerial transportation business to go beyond their function of economic safe operation and still be held in high opinion on the part of a scientific knowledge of human psychology may like our an existence but will never be a success. In other words, the sales start out with the click at a ticket window, or behind a counter, or the salesman who calls at your office or the sales and advertising plan, but back into the selection and length of routes, the hour and frequency of schedules, the size and choice of equipment, the arrangements, the conduct and the appearance of the interior, the location and the architecture of ground facilities, the co-operating of railroads with other forms of transportation, and the opportunity to be constructively critical of the manner in which operations are conducted under the system in an organization.

Transports are not yet comfortable, attractive, and dependable, especially at a rate that is within their reach, not beyond what they can spend. But it has been proven that they will stretch their limit if they are pleased and they are perfectly willing that a company which is giving a service be allowed to make money, but have a Twentieth Century mind which expects multiple performance, low cost and maximum value.

THIS PAPER on air transportation face to face with the necessity for bigger planes—planes of fifty to a hundred or more passengers—planes with not only seats to accommodate its passengers but additional space attractively laid out for lounging, smoking, refreshments and observations. Is there any reason to believe, given valid comfort, speed, safety and regularity are available at a reasonable rate, why day or night, passengers would not leave by air? From New York to Chicago—Los Angeles—San Francisco—New York to Cleveland—United States to Central and South America—or even across the ocean to New York to Bombay—when we have shiproads and railroad trains carrying two hundred to two thousand passengers daily? With these large numbers, costs per passenger could be so reduced that rates could be dropped in the scale of ground or water transportation and the operating companies would be in a position to enjoy profits.

At the present time, equipment has reached a point of development where, with proper maintenance, it can be trusted 100 per cent for the purposes for which it was designed, as proven by the millions of scheduled miles flown in the past twelve months over established routes. It has been handicapped by small capacity planes but great strides are now being made in commercial planes and some of the lines will, within the next year, have in operation planes of 32, 36, 41 and 49 passenger capacity. These are but the forerunners of the still bigger and more economical planes.

Wonderful increases that have been given by the United States Post Office Department to the movement of the air mail throughout the United States and Latin America and during the last few years passenger travel has been developed to a point that more than 165,000 passengers travel by air in the Western Hemisphere.

The name—"Aviation"—has its feet on the ground, its smile is good, his eye is on the ball and his swing has the right follow through.

DEVELOPING THE *Foreign* Aircraft Market



By LEIGHTON W. ROGERS
*Chef, Aeronautics Trade Division
Bureau of Foreign and Domestic Commerce*

To some manufacturers the development of a foreign market would mean worth while profits and a business life saver during periods of domestic sales slumps. To other manufacturers the development of a market across the sea would be but a waste of money and energy. At Mr. Rogers points out in this most interesting and informative article, export business should be regarded as more than just a side line to be taken up or dropped at will. It is a good source of business revenue that requires just as much executive skill as the domestic business. We sincerely advise every manufacturer to give serious consideration to what Mr. Rogers writes here about the requirements and methods of procedure in conducting a successful aeronautic export business.

EXPORTS of aircraft, engines, parts and accessories from producing countries have increased rapidly during recent years, although international shipments of these products are small in comparison with those of other items of transportation equipment. Figures just available for 1938 show an almost threefold increase in automatic exports over the year preceding. Because of the diversified uses of aircraft in the United States, it would appear that this country is probably first in supply the world market.

This does not mean that all American aircraft manufacturing companies should try the export market. These are businesses built up by experience which some companies would not be in a position to adapt. Do not "waddle" with export trade. Do as rash into it one year because business is bad at home and ease off on shadow in the next because business is good. You have to get into the market with sufficient attractiveness so that you can work on a shoe to five year program, and an improved product if it far better not to enter export trade at all. This does not mean that only the large concerns or groups strong enough to have separate export managers can be successful, as experience in the automobile field has shown that some of the most successful American cars in export trade are not especially important in the domestic field, nor are the companies manufacturing them. The concerns have usually concentrated on building up export trade over a period of years.

Many export departments and companies have failed in other trades because too often export managers have been turned over to clerical or minor business activities. This is folly. The problems of exporting are special and they require the best possible executive ability. One of the most successful truck exporters in the United States attributes his success in export of the company of which he is president to the fact that his product is the best that can be made for the money, that he person-

ally gives much of his time to the export phase of the business, and that the factory has explicit instructions to give export orders preference. Over a period of five years, this company has built up an export trade which forms a solid, comparatively non-fluctuating undercurrent to its business which carries it through whatever

ten years occur in its large domestic market. This is the type of incentive practice which aircraft exporters follow with profit.

The Department of Commerce is prepared to render assistance to manufacturers desirous to develop export markets in improved products along sound lines.

One of the major functions of the Aviation Trade Division is to point the way to American manufacturers of airplanes and related products toward successful exporting. The district and cooperative offices of the Bureau of Foreign and Domestic Commerce of the Department of Commerce are placed at important centers so that exporters and potential exporters may have questions answered which might arise in any phase of their export trade. Files are maintained in the offices enabling their staffs to anticipate some of these questions and render services automatically available toeronautics firms listed on the Bureau's exporters' index. The names of prospective importers and dealers of aircraft engines, parts and accessories, numerous opportunities for the sale of such equipment and parts on export conditions are made available only to bona fide United States firms (with at least 51 per cent of capital controlled by citizens of the United States). The exporters' index, furthermore, enabling manufacturers or exporters listed to this complete service, may be obtained upon application to the appropriate division or cooperative office.

The Aviation Trade Division has received a very considerable degree of cooperation from the 63 foreign offices of the Bureau located in strategic points throughout the world for the specific purpose of aiding American manufacturers to market their products, as well as from Consuls of the Department of State. It is the function of the Division to coordinate the aeronautics trade promotion work of the various foreign and domestic offices and to give advice to the unincorporated securities.

Also basic and current market data are obtained and disseminated which will enable these importers, whether or not experienced in export, to have a complete and accurate picture of the elements, both favorable to and inhibiting against, the importation of United States aeronautics equipment.

The district and cooperative offices will be pleased to answer all questions possible and pass on specific inquiries to the Aeronautics Trade Division, which for no reason, cannot be replied to locally. For purposes of expediting the service, it is suggested that the aeronautics cooperative offices be consulted rather than the Division direct.

Some airplane and aeronautics product manufacturers have been found to be wary of foreign business, having obtained the impression that exporting is fraught with mystery. They seek import duties, translations, etc., and from foreign languages casting doubt on shipment, commercial barriers, methods of payment, etc., as insurmountable barriers to successful exporting. These problems can be quite simple when the industry knows where to go to for information and assistance. The aeronautics cooperative offices, however, do not claim to be an infallible source for everything that the interested exporter may require. It is better even with the facilities at its disposal, under a unique service, sometimes not only as a clearing house of information available from outside sources. It follows stringently the policy of not displaying any services rendered by others. No matter how foolish a question may be in the mind of a member of the aeronautics industry, the Division should be called on and will return a courteous and positive reply.

It has been discussed in the situation of the Division by foreign individuals and firms of unincorporated firms and shipping and insurance that their inquiries, some even by cable, for specifications, performance data and prices have never been answered at all, or replied to either in-

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sufficiently or too late for consideration. Nothing can stir a more unfavorable impression in the minds of prospective buyers. It is realized that some manufacturers were for a time unable to meet domestic demand and that, during certain periods, they have been losing up to new models. It is suggested that regardless of whether a sale can be concluded at the time, estimates answers be made to any inquiries from abroad. Careful and expeditious replies to inquiries from foreign countries will map dividends in the future when the aeronautics manufacturer is in a position of obtaining foreign contracts.

IT IS UNNECESSARY TO HAVE

Low bid rates of import or certain duties except an indication of market potentialities, for these duties are absorbed by the exporter and should under no circumstances be included in the quoted price. Aeronautical products are to act as items in international trade that some governments have not yet established rates for them, while others assume the attitude that it is better to accept free air mail operation, waiving the consequences of import duties and passing on the cost of delivery, free entry. It should be considered that rates of duty are subject to change and any compilation covering a great number of countries would soon be out of date and its use, therefore, of negligible value.

To that connection certain countries assess duties, particularly on parts, on the basis of the components, each item taking a different rate. As there are so many component parts of an airplane and engine, and each would be classified differently in certain tariff schedules, it would be impracticable, if not impossible, to furnish all rates for all countries. It should be remembered that if a market exists in a foreign country for United States' aircraft, the tariff will have small bearing upon the successful conclusion of the sale. Possessing no countries with the exception of certain British colonies in favor of products made within the British Empire gives fewer duty rates in European aeronautics than to Americans.

The Division of Foreign Tariffs, through the domestic offices, will be glad to answer inquiries as to the various duty rates assessed on aeronautics equipment. Here again it is pointed out as being advantageous to contact with the local office as it may have the required data immediately available.

Translating bureaus, foreign language schools and some foreign students in universities are capable of making translations. Care should be exercised in the selection of capable translators, particularly for purposes of translating English into a foreign language. The local Departmental representatives can often advise where the services of authorized translators may be obtained. English is becoming, to a certain extent, the international commercial language and most foreign firms and individuals with whom aeronautics exporters deal, would have a

Trans. Air products being shipped to Honolulu, Hawaii

sound knowledge of that language. It is sometimes polite, however, to make reply in inquiries in the language of the inquirer, as it is certainly necessary to have advertising and sales literature prepared in foreign languages. Of utmost importance to sensible advertising literature is that of having translations made properly so they will not be ridiculous in the eyes of foreign readers. Quantities are in practically all cases required when known as a C.I.F. rate (C.I.F. meaning all costs, insurance and freight to the port or point of entry, free delivery, free entry). It should be determined whether the shipping cost will be paid by the U.S. Government, or by the customer. Included in these questions would be the C.I.F. pricing, shipping costs, delivery to steamer, point of entry, overland, and if the shipment is destined for a foreign overseas, the ocean freight and marine insurance. It is assumed that the manufacturer or exporter obtain the necessary data and submit the form of quotations requested.

Properly speaking, there are as factors other than those named included in C.I.F. rates, but in some countries where the consular fees are assessed before shipment the cost of consular documentation should be included. It is not difficult to obtain information as to the various rates entering into a C.I.F. quotation.

The local railway freight office can furnish rail rates. And if steamer-ship freight offices and marine insurance agents are not located in the vicinity, the local district representative of the Bureau can advise where to get the information needed, or can obtain a considerable bulletin from his local organization or other manufacturers who have quoted on a F.O.B. basis when C.I.F. quotations were specified. The reason for this is that the supplier cannot, without considerable trouble and expense, obtain the rail rates, marine insurance and ocean freight rates, whereas this information is more easily available at the source of the shipment.

Cabling is an item entering into a C.I.F. quotation and it is important to figure separately the cost of material and labor involved. It has been directed to our attention that a smutty quota was made for a single engine sales price of 220 hp at a cost of \$350, and an export quota for a two-place open cockpit monoplane of



Working planes on the deck of a ship building the bridge piers.



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60 kg. for as low as \$150. As airplanes are of comparatively light weight the ocean freight rate is usually calculated on a cubic rather than weight basis. Because of this there is no reason why crates should not be made strong. It is advisable to cover the airplane and engine with tar paper to prevent damage from salt water. The Padding and Materials Handling Section of the Transportation Division has prepared some specifications of airplane crates used for export shipments and these may be obtained through the local office.

The local offices of the Bureau are in a position to advise where the certifying of agents and other considerations necessary may be observed and can further advise what to go for aid in this connection. Some banks and most freight forwarders with branch offices in imported centers are equipped to handle the actual paper work on foreign shipments, which in some cases, is quite involved. Charges for this service, included with those for the main service of freight forwarders and banks with foreign departments, are very reasonable. When a consular officer is reported and a consulate of the country involved is not located in the vicinity, the forwarder and banking connection can sometimes arrange to have the consular papers executed and valid at the seaport. The local office can advise when firms and individuals performing this function are located as it can be regarded as officially published sources of detailed information on documentation in the event that the manufacturer or shipper desires to handle the paper work within his organization. The office can also advise where consulates are located.

INTRANCE to this business is undertaken by firms specializing in this business. A lot of these firms may be selected from the local office. At present the form of coverage for airplanes follows that for automobiles and is generally on the basis of so many cents per each \$100 of value, depending on the destination, and when the crates are stowed under deck, includes coverage for brokerage, theft and pilferage. The rate on planes stowed above deck is considerably higher and the form of coverage is as liberal as the under deck policy. The cost of marine insurance in all of the charges in included in figuring a C.I.F. quotation and it is all costs assumed by the shipper.

Distributor's agreements in some instances, cover the subject of financial arrangements and credit, and specify cash before shipment, except in the case of a firm which has been granted irreconcilable letters of credit which have been opened by the foreign buyer with some American bank. The bank should confirm to the exporter the fact that such a letter of credit is available and under what terms and for what amount the letter of credit is open.

Verifications in lots of different countries make it difficult to generalize in regard to the subject of distributor's and dealers' agreements. The Commercial Division of the Bureau, through the local office, is in a position to advise on this subject although it is not the function of the Division to act as an attorney. Letters of attorney in this country and abroad comprising a draw up suitable agreements may be obtained upon application to the appropriate Bureau office.

IT is of great importance to see to it that, when possible, advertising matter goes into a foreign country without the necessity for expense on the part of the exporter. In all countries this cannot be accomplished nor is it always possible to prepare bulletins which are sometimes assessed as advertising literature. There are certain working requirements which should be observed as well as methods of shipment applicable for certain countries in order to insure freedom from duty or the lowest possible import duty rate. To meet the need for information on this important but seemingly insignificant point the Division of Foreign Trade has prepared a pamphlet entitled "Shipment of Samples and Advertising Matter Abroad." This publication also serves as a complete guide to the use of air mail post on foreign trade.

Probably the first step toward getting a product ba-

sin will soon be finance houses who will take care of credits in theeronomic export field. It is recommended that the unrepresented exporter always consult his banking connection about methods of transferring funds and on title of credits.

The most important factor, of course, in granting credit is that adequate investigation be made. The Commercial Intelligence Division of the Bureau has reports, available through the local offices, on over 300,000 foreign importers. The world organization of field offices which keeps the Commercial Intelligence Division ex-



Stinson planes en route to Africa for use in the aerial service of your country

solutely supplied with up-to-date information on foreign firms can also make special and thorough investigation in case of need. In addition, banks, insurance agencies, foreign credit associations and the credit agencies are in a position to supplement the Governmental experts or give the prospective seller the benefit of the longer experience of others.

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Probably the first step toward getting a product ba-

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sin the prospective consumer is to send descriptive literature including specifications and performance data to a selected list of firms and individuals logically on the market for airplanes for resale or for their own use. The Aviation Trade Division has disseminated lists for this purpose which will be revised when the collection warrants. American consul and representatives of the Department of Commerce should consult each such supplier with a few sets of literature. House organs such as published by certain aeronautical manufacturers may be helpful, although unless translated into Spanish would not be of much value in the Spanish-speaking countries. Other importers on the market for airplanes, particularly those in Europe would be able to read English if not able to, and if sufficiently interested, could have translations made without much difficulty. There is one exception to this general rule and that is in the case of Brazil, where Portuguese is spoken. It would hardly be worth while to translate a considerable number of catalogs and other literature for this market. Some manufacturers after a Brazilian distributor is appointed, might let him make the translation, the former absorbing all or a part of the expense of preparing in Portuguese. This procedure has been followed in other lines of business and there is no reason why it would not work out advantageously for the exporter of aeronautical products.

Sales literature consisting of brochures, catalogues, tables of performance data and specifications as prepared for the domestic market are in most cases easily suitable for foreign consumption as the typical of aviation is universal and the same factors which would be considered favorably in this country would apply abroad. This applies also to advertising copy.

After securing a market for reaching the foreign market is by advertising in the foreign aeronautical press. The Speculative Division of the Bureau, through the local office, can advise where such journals are published, their reader influence, circulation and rates. Advertising agencies handling the placing of copy in foreign periodicals are in a position to supplement the information available from the Speculative Division and can advise whether or not advertising in specific foreign markets would be warranted. Because of the limited market for American aircraft in Europe, it would hardly be worth while to advertise extensively in European publications. Likewise in Australia and the Americas the few aeronautical journals may be considered good mediums. Some of the United States publications carrying in foreign importers and dealers in aeronautical products and general merchandise lists are worthy of consideration.

It is only by aerial demonstration in the field that some markets can be opened for airplanes. Sending one or two airplanes to South America, for example, would be costly and the immediate results may not appear to justify the expense. It is believed, however, that if any appreciable foreign business is to be obtained this unusual expensive patterning will be necessary.

The points in the West Indies and Central America presenting possibilities for aircraft sales could be covered en route to South America proper. Export pilots, of course, should be chosen to fly these demonstration airplanes and if the pilot is not an experienced business man with a speaking knowledge of Spanish and Portuguese and conversant with the Latin temperament, he should be accompanied by a man qualified in that respect. A man with such abilities could contract with

distributors and perhaps aid in the promotion of intra-Asian airlines for which there exists an apparent need. It has been estimated that it would cost from \$50,000 to \$150,000, depending on the type of airplane, to send a demonstration plane and personnel to South America, present the plane to the market and return. The market in South America's neighbor countries in that same country will make brief mention of airports available for use by demonstrators, and on which details may be obtained from the Foreign Information Section of the Aeronautics Trade Division.

It is possible that manufacturers of well-known types of aircraft could obtain suitable distributors without sending a demonstration plane by sending an experienced traveling representative, of the kind that has already come into the most influential circles of the countries to be covered. This type of man would know of the publications of the Bureau of Foreign and Domestic Commerce which would be of value to him, such as the "Commercial Traveler's Guide to Latin America" (Miscellaneous Series No. 89) giving information as to surface transportation methods, hotels, customs, etc., of all the Latin American countries.

It has been estimated that it would cost a minimum of \$50,000 to \$150,000 per year man in a "face-to-face" tour to all of the important Latin American countries. This man could be supplied with operating cost data, models of airplanes and do a great deal of preliminary work of value. His greatest task would be to make connections for the manufacturer with representatives in a position to negotiate sales after his departure from the territory. Paradoxically, it may be said that a man capable of this sort of work would command more than \$35,000 a year. Commissions on business realized as the result of his work would naturally enhance his incentive as well as his income, in addition to the \$35,000 figure. Such men as in Europe or the Far East could make their headquarters at central points such as Paris or Shanghai and journey to other facilities upon advice from the factory or other sources that potentialities exist elsewhere in the territory for airplane sales.

New opened databases of airplanes are in existence in foreign countries, such as those within the United States, which have in the same graduated from being "showrooms" and local sale operations, with our own plan to expand to commercial airplane distribution and sales. In foreign countries, especially after the examples of those employed as established airlines, are scarce and there are practically none of the so-called "flying bus operators." Accordingly, it will be necessary for airplane manufacturers to seek outlets other than the type which has plagued the distribution of airplanes in the United States. Here other types of airplane outlets are being considered such as automobile dealers, department stores, etc. The foreign aeronautics distributor and dealer appears to be the most logical class of prospect for the handling of airplanes. General mechanical firms dealing in the share and agricultural implements, and machinery houses, would in some cases serve as good connection. Native aviators with some experience have been known to establish such firms as those in the importation of airplanes. Organizations with shops for the repair of automobiles and tractors could expand their facilities for the repair and service of airplanes and engines. The names of firms dealing in aircraft, together with suggestions as to those who might be interested are available at the Aeronautics Trade Division.

THE NEW *Detroit CITY* AIRPORT

BY JOHN T. NEVILL
Detroit Editor of AVIATION

AFITTING EX-CAPLE of lace, mauldry, bath-centered matrons can be converted into a public work of art, as the city of Detroit City Airport, in which the Motor City is living half its woe, the third annual All-American Aircraft Show.

A majority of the pilots and aircraft executives visiting the airport are perhaps finding it difficult to believe that while more than one year ago the program under guidance of the managing Department of Public Works was just beginning to emerge from the mire of bad known hangars, that the entire length of its longest stretch was marked by a crumpled bottom, an irregular wall, 200 ft. wide and, in places, as much as 20 ft. deep, that the property was, in fact, two rectangular plots containing 80 acres, from one another and completely separated by a paved public thoroughfare several hundred feet wide that practically every square foot of both of these strips was soft ground; that the very intersection of these two tracts was the site of both gas-holder, 330 ft. high and a electricity consuming 1,400 horsepower, with gravity of lots left for a mere, scarcely "green and brown" setting for the airport atmosphere. Of the two plots, originally, the property was one without the invaluable high aviation position, which stretched along the longest border dangerously high above the ground. And—according to \$200,000 garage and supply building owned by the Detroit Fire Department was situated well within the enclosed area, which meant that it had to be razed and rebuilt elsewhere.

These, and other "little" matters, like the renovation and rebuilding of a gas plant, the condemnation of a concrete with the consequent removal and removal of 3,400 dead, the closing of a wash and public latrines over the posture of a hundred unattractive and unappreciative taxpayers, men of the factors only offend had to take no consideration.

A rather disengaging picture seems an aeronautical masterpiece, but not entirely logical. Two rather important factors determined the definite location of the site for development: the first, "One was that the City of Detroit clearly owned the property and the other was that the site was close to being only five miles north east of the City Hall." So late is 1937, while the City's legal department was just beginning to make up its mind of litigation that, to some extent, still hangs about the airport like so many persistent mites, the Department of Public Works, under direction of the City Council, rolled up its sleeves and began to "drive out the crickets and frogs."

The members of the industry who visited the 1929 All-American Aircraft Show heard many rumors about the "wonderful" airport which would be the scene of the 1930 show. These rumors, like many others that were floating about at the time, were promptly forgotten by many as soon as the city limits of Detroit passed by the trailing edge of the lower wing. However, rumor has become a most decided fact, and the "wonderful" airport is the scene of the 1930 All-American Aircraft Show. In this article Mr. Nevill describes in detail the equipment installed, and relates of the various obstacles that had to be overcome before the port was a reality.

Before going into detail as to just what the Detroit City Airport is like today, it might be explained that the gas-holders and the rottanas are still there, although other developmental work on and about the airport has sufficient consciousness that somewhat additional ground-space has been made available. At present, however, separated, particularly 180 ft. apart, between the gas-holder and the original pictures of the two tracts, has enabled the airport area to approximately 250 acres. The closing of French Road, the branching thoroughfare in at this writing, still an unaccomplished ambition, the city should being served by a taxpayer's suggestion, although two of the airport's bare surfaced runways now extend across the road and surface traffic the thoroughfare is controlled to accommodate airplanes using either of the runways.

Notwithstanding these drawbacks, which none, so double, will cause Detroit City Airport today is a comely



DETROIT AIRPORT OF THE TERMINAL
Building to be opened at the
Detroit City Airport

to the community, particularly when considering its convenient location. Its size and equipment is sufficient to give it a first-class status. Department of Conservation rating and when night lighting facilities are completely installed Detroit's airport will possess an A-1 rating. The initial program has been filled in, ground, drainage, model, culvert and fenced in. Approximately one thousand sets of 60' wire fence have been put in for the property, so that it has no slope steeper than 2 per cent in any direction. The drainage system consists of 32 culverts of 4x6 in diameter fitted with concrete ends and five miles of 12x18 in lateral sewers, laid in grid fashion and connected to a main sewer, which is part of the city's sewage system. The fencing is of the chain link and wrought iron type and measures in all 22,600 ft., or nearly four miles.

Three hard-surfaced runways (concrete and asphalt) extend for a total distance of 21 miles at this writing. One of the runways extends along the center of the north-south airport leg for a length of 4,900 ft. The second runway extends down the east-west leg for a distance of 4,150 ft. These two runways intersect near their lower ends. The third runway, now in existence diagonally across these two landing strips like the even number in a series, is also measured 4,262 ft. in length. When completed each runway will consist of two pavements, 100 ft. wide each, 50 ft. apart, so that the surface being totally distinct. Although the "standard" system has not been completed except for 1,600 ft. on the north-south strip, its construction is not far off. It is also proposed to put in a fourth set of runways extending diagonally across the east-west, or lower leg, and running in an approximate right angle to the diagonal runway now connecting the two legs. The runways already on have cost a total of \$262,600.

In securing the use of paved runways and at the same time going to considerable lengths in developing the remainder of the field it was the idea of City Engineer Perry A. Fellows, and William J. Wallace, engineer-in-charge of the airport, to embrace both the hard surface landing strip theory and the "all-out" idea. The double runway concept is another, were, of course, designed to accommodate a traffic control system to be planned after later. Mr. Wallace, incidentally, has handled two systems of traffic control especially for handling the multitude of planes expected on the airport during the Show.

The city took the first hangar on the airport as April last year. It is a compactly small but completely

modest building costing approximately \$55,000 and suitable for about 15 planes. Since then a \$42,000 longer and held office building has been privately built and is now being used by Schleicher-Brock Aircraft Corporation, who has a somewhat smaller hangar by Lawrence P. Fisher. It might also be said that about a year ago the City Council placed operation of the City Airport in the hands of the Commissioner of Public Works, whereas Mr. Wallace, a member of the city engineer's staff, was placed in charge of the airport. He wrote, in charge-changing, the title of Engineer-Manager. Since that time Mr. Wallace has become a station-pilot and now is about to make his first solo.

Another matter that must be mentioned involves the night lighting facilities. A Molaphase industrial lighting system costing \$23,880 has already been installed, the Council has just put in a system for modification of obstruction lights, and has asked for bids on a 4,000,000 cu. revolving beacon, as well as a 5,000 cu. auxiliary or

WILLIAM J. WALLACE, engineer-manager, Detroit City Airport, and K. D. Beilinger, Department of Commerce inspector at Detroit, have drawn up the following air traffic rules which, in addition to the usual Department of Commerce regulations, will be in effect at the opening of City Airport during the All-American Aircraft Show:

► All traffic around the airport will be counter-clockwise per hour in case of traffic jam.

► Maximum altitude over the airport, or adjacent terrain, will be 1,000 ft.

► Takeoffs will be made from a point designated by the aeronaut and only on the aeronut's signal.

► No aerial acrobatics, or climbing turns will be permitted outside of the airport, or adjacent terrain.

► Please ruling off will close the boundaries of the airport before commencing the first turn, which must be to the left.

► Landings will be only on the strip designated by the pilot manager, and carried out with a T- and shield to make as clear as possible.

► No landing over the runway area west of the airport and east of the boundary there will be permitted.

► Prohibited must be noise in all airplanes.

► When starting engines where noise is blocked and the cockpit must be occupied.

► Airplane will not be left with engine running, unless someone is in the cockpit.

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identifying beacon. A system of floodlighting the popular shaped field from atop the gas-boiler is now being studied and the tall gas-lit bollards or flood lights will also feature at the site. It is anticipated that a number of manufacturers of airport lighting equipment, exhibiting in the Show, will offer to give practical exhibitions of their products by floodlighting the field with temporary installations during the Show.

After a series of bitter-discrepancy or inter-political disagreements, during which the City Council facilitated the main hangar project back and forth among themselves, an architect, who had been retained by the Council to design the hangar was paid off and the Dept. of Public Works gave the assignment of designing and contracting for construction of the building. Despite the handling of money to the tune of more than \$300,000 worth of steel contracted for by the Council, designed and fabricated for the original architect's bidding and having to erect a suitable steel building costing approximately half as much as the original designed structure, the Department and the W. W. Ward Company, contractors have equipped a strictly modern hangar and administration building that can be rightfully called the world's largest airplane hangar.

The Detroit City Airport Hangar extends north and south for a distance of 1,014 ft. along the lower or southeastern portion of the project's north-south leg. To be more explicit, 8 ft. lies between the roadway, which borders French Road on the east, and Conner's Avenue, which borders the north-south leg on the east. As stated, it is 1,014 ft. long and 250 ft. 5 in. wide at its widest portion, which is through the bay at the southern end. Throughout the middle section it is 204 ft. wide and 127 ft. 5 in. wide through the northern bay, which bay faces

the port's castle area. This latter section will contain the administration offices, customs and immigration offices, ticket office, concession, poker club room, newsroom, press room, radio room, and a large room all grouped around a large writing room similar to that of a railway depot. This last, also measures 127 ft. 5 in. x 114 ft. 4 in. outside. Above it, at the merchandise roof top of the structure, is a polygonal observation and control tower, framed with glass and steel. The tower, which will be equipped with all modern field control facilities places the observer's eyes approximately 50 ft. above the ground. The remainder of the structure's roof is approximately 40 ft. high.

Consisting of steel and glass with approximately 60 per cent of its exterior comprising door and window areas, the huge building has a strong tendency to dwarf the field, although due to its location it is completely out of the way of all flying activities. The building contains a total of 202,000 sq ft. of floor space, approximately 193,000 sq ft. of which will be used for storage, service, and loading purposes. Just behind the administrative section, is one large bay, the inside dimensions of which are 180 x 200 ft. Just south of this is



HARRY A. FOLLETT, CITY
ENGINEER, DETROIT, MICH.

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Front view of main hangar and auxiliary building at Detroit City Airport. Note control tower.

the large central section containing 10 bays, each 121 x 100 ft., which spaces, in turn, give way to two additional bays at the southeastern end, each measuring 115 x 125 ft.

The structure is founded upon a total of 1,102 concrete piles, each coated from 25 to 50 ft. in the ground. Pilings of the hangar proper are of concrete, suitably dressed, and all interior walls are faced with soft glazed marine face "Brickite". Roofing is of Johns-Manville 15 year bonded composition over 3 in. "Insulite" insulation and resting on a pre-cast Haydite concrete channel tile roof deck.

The experienced airport operator will be interested in the heating, lighting, operation of the doors, and the prevention features of this structure, all of which have been transferred or adapted from the city. Probably the most interesting of these is the deluge type fire prevention system, which was installed by the American Seawall Corp. of America at a total cost of \$151,500. The system consists of 6,000 sq ft pipe ceiling and floor heads which go into operation automatically following a rate of temperature rise of 15 deg. per minute. Thirty-five hundred of the heads are located in the ceiling and 1,200 in the floor, all being spaced 10 ft. from one another in each direction. Every 6,000 sq ft. of space above the bottom of the building's trusses is enclosed by a metal drift curtain, which encloses the heat, causing early operation of the heads in one compartment and preventing operation of many heads than are necessary to extinguish the fire. Each one of these 6,000 sq ft. areas is equipped with its own 6 in. sprinkler valve, which may be opened by any one of four actuating devices located in the respective compartments.

It should be understood that the degree of heat alone, will not affect the operating device; rather, their operation is caused only by the rate of temperature rise of at least 15 deg per minute, which places the possibility of their going into operation during exceptionally hot summer days quite out of the question. Following total extinction of a fire the valves are closed manually. The entire sprinkling system is fed by a 24 inch water main, part of the city's system, which operates under an approximate pressure of 50 lb.

The Firestar doors, which, of course, extend along both sides of the structure, are of the tubular straight

track type and supported on 16 ft. rails flush with the floor. In the smaller bays a 20 x 99 ft. clearance is provided, while that of the larger bays is 25 x 149 ft. Although the larger doors provide sufficient clearance to admit the largest heavier-than-air craft now built in this country without necessity of disassembling, provisions have been made to increase the height of the doors from 25 to 30 ft., when that becomes necessary. The larger doors, incidentally, have been motorized by installation of Allen and Brew duplex drive heavy duty electric motors, and can be opened or closed by the pushing of a button above the doors.

Heating in the hangar area is provided by floor mounted burners. Burner unit heating employing a single stage pressure at the burner of 125 psi. per burner. Multiple outlets of the burners will direct heat at the various sections of the building. The system is designed to maintain a heating air temperature of 25 deg. F. under the most severe outside weather conditions. A lighting system providing approximately one Watt per sq ft. and controlled from panel boards located near the entrance of each bay takes care of night-time illumination. The large percentage of window and door area already mentioned will provide ample daytime lighting.

All of the wide doors at Detroit's city airport, the filling, draining, grading, runways, fencing, lighting and the two municipally owned hangars now completed has been financed by a portion of the \$5,000,000 bond issue voted by the taxpayers in November, 1935. Before closing it should be noted that the main hangar, costliest of the projects, was designed to be a more comprehensive future plan, provision in which plan is a proportion to erect a separate administration building, freight houses, and a double track express service and passenger facilities in the present hangar by nearly 15,000 sq ft. Under certain drawings already prepared the former structure would occupy the area now belonging to the cemetery association, which the city is attempting to purchase at the present time.

In fact, it has been stated that when it is absolutely necessary, it will not be impossible to acquire practically all of the property now lying between the airport's two 80 deg. legs, and turning the property into a triangular airport, rather than an L-shaped one.



Aerial view of Detroit City Airport. A—hangar and auxiliary building. B—service hangar. C—land available for future development. D—quadrigale. E—land currently reserved.

WHAT THE *Industry* IS

A Listing of the Various Products of Airplane and Now or that Will be Placed

IN THE International Aircraft Exposition number of *Aviation* (Feb. 15) there was printed a statement by leaders in the American aeronautic industry of 1930 overshadowing and design needs of both aircraft and engines. The symposium, which was carried through two other numbers of *Aviation*, was the result of a questionnaire sent to the industry's executives with the request for individual expression of opinion. The expressions of opinion regarding the industry's ma-

jer problems were not only interesting but most informative. Therefore it seems altogether fitting that this Manufacturing and Sales Number of *Aviation* should contain a listing of the products that these manufacturers intend to develop and merchandise during the current year. Many of them are on exhibition this week at the major hangar and exposition building at the Detroit City Airport; the others we may expect to view between now and the Vulteeless session.

Airplanes

ALLISON

FOUR NEW PLANES will be offered by the Allison Aeroplane Company of Lawrence, Kan. The first is a single-seater, semi-cabin, high-wing monoplane with a Salsbury 40-hp engine, which will be priced at \$1,278. The second will be a two-seater that control light biplane powered with a Villiers or LeBlond engine, and priced at \$2,263.

As a third offering, the company will put out a two-seater side-by-side, high-wing open monoplane, powered with a 90-hp air-cooled engine. The fourth plane will be a single-seater light biplane with an engine of approximately 30 hp. Data on the last two planes, at the present time are not available.

AMERICAN EAGLE

AFTER THIS PLACE空中 monoplane is being introduced this season in America. Eagle Aircraft Corp., Kansas City, Mo., the standard model carries a Wright J-6 165-hp engine, while other engines will be fitted if desired. Features of the plane are wide visibility, 9-ft. leading gear track, wheel landing tail wheel, folding wings, three doors to the cabin. High speed with the 165-hp engine is given as 147 mph.

Walter Aircraft Co., division of the American Eagle corporation, will continue to build the Walter Tornado, a three-place folding-wing cabin monoplane, selling for \$8,796 with Kinner engine. The Walter plant is now located in Kansas City. The American Eagle company will also continue to build five models of open

cockpit biplanes, with power plants ranging from OX-5 to Wright J-6 225-hp engines, as part of a program which aims to present a wide variety of planes.

BIRD WING

THE BIRD WING COMMERCIAL AIRCRAFT COMPANY of St. Joseph, Mo., will concentrate production during 1930 on the Bird Wing biplane. This plane is particularly adapted to use by flying schools and for private and cross country flying. It has passed all of the approved type certificate tests required by the Department of Commerce.

BURL

THE BURL AIRCRAFT CO. at Mayfield, Mich., has announced a conservative production schedule for the year 1930. During the early year, the company will continue to manufacture American, with models ranging from the eight-place cabin monoplane priced at \$19,000 with Wright Cubone or Hornet engine, to the three-place cabin machine selling for \$11,000 with Wright 225-hp engine.

BOEING

IS. shortly to the military planes which will be built for the Army and Navy, Boeing Airplane Co. is manufacturing several commercial models. Model 100, a sportman's version of the P-12 military model, developed speeds in excess of 200 mph during recent tests

OFFERING FOR 1930

Engine Manufacturing Companies that Are Available on the Market This Year

The company is also offering an improved modification of Model 204, six-place flying boat, with speed and so increased 15 mph., take-off reduced by 8 sec., and rate of climb improved by 250 ft. per min.

Two types are offered for transport use. The 40-3-4, four-passenger mail plane with Hornet engine and top speed of 140 mph., has been in use for some time on several different routes. A new eight-passenger twin-engine transport, representing a development of the company's earlier model 80, was introduced last summer, and several of the planes are now in active service. All Boeing commercial planes are now sheathed and wired throughout for radio installation.

BURNELL

THREE LINE ORDERS by Upper-Southwest Aircraft Corporation, for 1930, will include both large and small planes. Burnell transports of twenty- and forty-passenger capacity, at \$85,000 and \$85,000 respectively will be held to order. The company will also offer twenty- and thirty passenger amphibians using the Mattheson amphibious gear. These amphibians will sell for \$65,000 and \$65,000 respectively.

Amateur land and amphibian planes will be produced. These are two place low-wing monoplanes ranging from \$1,000. The amphibian, with 60-hp engine, sells for \$5,000, the seaplane, with a 60-hp engine, for \$4,500, and the land plane, with the same engine, for \$3,500.

Amateur motor gliders of all sizes will be held to order. Monoplane, radial, air-cooled, 315-hp engines will be built. This engin holds the Department of Commerce Approved Type Certificate Number 41.

CURTISS

SIXTEEN MODELS of the P-12 flying biplane family, using a wide variety of engine equipment, will be offered by Curtiss Aeroplane & Motor Co., Garden City, L. I., N. Y. Additions to this list of engines with which it can be fitted the plane will be commercially the same as last year's model. The company is also introducing the Kiteplane, a two-place cabin monoplane, powered with two Wright J-6-7 engines.

Curtiss-Rohrman Airplane Manufacturing Co., St. Louis, Mo., will continue to produce the Rohr, a three-place cabin monoplane powered with Curtiss Challenger, OX-5, or Wright J-6-5 engine. A modified Rohr seat-

ing four has also been introduced, resembling the divers-plane fuselage closely in other respects. The price of the three-place Rohr is \$4,000 with OX-5, \$7,500 with Challenger or Wright engine.

CAVALIER

FOUR TYPES of Star Cavalier cabin monoplanes will be produced during 1930 by the Star Aeroplane Company of Birmingham, Calif. All of these planes will be identical except for engine equipment. Two models powered with Lorraine engines of 63 and 90 hp, respectively, will sell for \$2,985 and \$3,450. The model with the Ganz will sell for \$3,375, while that powered with a LeBlond will sell for \$2,985.

COMMAND-AIRE

COMMAND-AIRE Inc., Little Rock, Ark., began 1930 with fine results in production. A two-place training plane with Warner engine, having Goodyear air wheels as standard equipment, sells for \$4,365. The standard Command-Aire three-passenger sport plane is now offered with Challenger engine at \$5,950, and with LeBlond 210-hp engine special landing gear and tail wheel, sells for \$5,625. It is anticipated that other models will be added to the line later in the season.

EASTMAN

EASTMAN AIRCRAFT CORP., which became one of the units of Detroit Aircraft Corp. last year, will continue immediately at the three- to four-place open flying boat which has been the company's standard model for some time. It is powered with a Curtiss Challenger engine, mounted to drive a pusher type propeller, and the list price is \$9,295. Ryanair Detroit.

DAVIS

DAVIS AIRCRAFT CO. is presenting two new monoplanes for 1930: the Davis D-1 powered with the LeBlond 65 engine, and the Davis D-2 powered with the Kinner engine. Both are two-place open cockpit planes, and both embody the wing design characteristics of Davis Monoplanes.

Both the Davis D-1 and the Davis D-2 are of all-metal construction throughout, with the exception of

wing spans of laminated spruce, and fabric covering other parts of fuselage. The entire leading edge of the starboard duralumin wing is covered with fabric. Dimensions of the fuselage are 20 ft. long by 4 ft. 6 in. wide by 4 ft. 6 in. high. Weight of the fuselage is 1,000 lbs. The engine is a 100-hp Kinner or Warner. The propeller of diameter permitted removed from wings in two pieces. The Davis D-1 lists at \$1,285 complete, and the Davis D-6 at \$1,485 complete, flyaway at field, Richmond, Indiana.

EAGLEROCK

ALEXANDER AIRCRAFT CO., Denver, Colo., will continue to produce the well-known Eaglerock three-passenger biplane during the coming year. It is offered with Wright J-6 Five-Couet, or Kinner engine, being priced at \$3,969 with Kinner power. The plane is also obtainable with engine and propeller for use with OX-5, OX-6, or Hispano engines.

In anticipation of a growing market for fast cabin planes, the company is featuring the Alexander Bullet, a four-passenger touring monoplane which will be offered at a speed of 150 m.p.h. with Wright J-6 165 hp. engine. At the present time, Alexander Aircraft Co. will continue development of its own nation-wide system of distributors and dealers. A private type glider is also included in the line, as it is felt that through the development of gliding, the market for planes may be increased.

ENGINEERS

ENGINEERS AIRCRAFT CORP., Stamford, Conn., is planning to put a new plant into production. This plant will be known as Model EAC-1, is a two-seater, side-by-side cabin monoplane, for sport and training. Due to a wide sweep-back of the wings, good visibility is provided. The plane will be powered by a Wright Gypsy engine, and will sell for about \$3,000.

FAIRCHILD

A NEW TWO-PLACE open biplane for sport and training, with tapered wings and carrying Kinner engine, is added to the line of planes offered by Fairchild Aircraft Corp., Farmington Hills, Mich. It is designated as model KR-3, for 1930. This model sells for \$4,065. The company will also continue production of the Fairchild KR-3M, three-place open biplane with Wright J-6-3 engine, selling for \$6,375.

Two cabin monoplanes, feature folding wings, are included in the Fairchild line. Model 42 is a four-place machine with dual control, powered by a Wright J-6-9 engine, selling for \$12,900. Model 71, intended for transport use, carries seven passengers and uses a Wasp engine. It is priced at \$16,900.

FLEET

THREE MODELS constitute the line offered by Consolidated Aircraft Co., Buffalo, N. Y., for 1930. The Fleet two-passenger training plane, a development of the Husky training planes made by the same company for the Army and Navy, is offered in a new model with either Kinner or Warner engine, priced at \$3,965 and \$4,065. With Edo pontoons, it costs \$4,000 more.

The Fleet all-metal monoplane, designed to carry six passengers with seat or freight at a high speed of 175 m.p.h., will be put into annual production. Six models

are being built on patterns for NYRRA Inc. With Kinner type engine and Emetor Series B engine, the plane sells for \$27,200. The Consolidated Co. will also manufacture a development of the Commando dual-engine twenty-passenger flying boat, features of which have been ordered by NYRRA Inc. This plane also carries Emetor power, and is listed at \$35,000.

FOKKER

THE PRE-EMINENT DEVELOPMENT of the Fokker Aircraft Corp., Elizabeth Heights, N. J., for 1930 is the F-32, the largest land plane built in America. The first of the six planes of this type ordered by Western Air Express is now in service, the second is in process of delivery and the remaining four are on the construction line at the company's Elizabeth Heights plant.

With the amphibian and boat types at \$40,000 and \$40,000 respectively, the tri-engine version is at \$67,200 and \$47,000. The mid planes at \$35,500 and the Super Universale and Universale at \$31,800 and \$35,000, the Fokker line remains in the relatively high priced class.

FORD

AMONG THE NEW MODELS in the 1930 line of Ford All-metal tri-engined airplanes, built by Stout Metal Aircraft Co., Dearborn, Mich., are the four cabin planes of the 3-AT type which are furnished with either leading gear or pushers and which are offered with a wide choice as to interior accommodations and decorations. The price varies from \$60,000 to \$62,000.

Another Ford plane recently introduced is the 2-AT triengined land plane. Its dimensions follow closely those of the 3-AT, the essential difference being the substitution of two Wright J-6 300 hp. engines for one of the Wasps. This gives a total horse power of 1,025 and results in a maximum speed of 180 m.p.h. The maximum speed is 150 m.p.h. and the cruising speed 130 m.p.h. The price is \$51,000.

The Ford line also includes the 4-AT land plane and the 6-AT sea plane, each powered by three Wright J-6 engines. The 4-AT sells for \$42,000 and the 6-AT for \$54,000.

The company also builds a 9-AT, which is of the same size as the 4-AT, but which is powered by Pratt & Whitney Wasp Junior engines.

KARI-KEEN

KARI-KEEN AIRCRAFT INC., Sioux City, Iowa, will produce the Kari-Keen model, a two-place cabin monoplane designed for the use of business men and private owners. The plane is built to sell at \$3,450 delivered at the factory. It has side-by-side seating arrangement, and uses a full cantilever wing.

KREUTZER

JONATHAN KREUTZER CORP., Los Angeles, Calif., will construct during 1930 a two-engine cabin plane. Four models will be offered: the K-3, powered with three 90-hp LeRhône engines will sell for \$19,000, the K-6 and K-7, powered with Warner and Kinner engines respectively, will sell at \$22,000 and \$26,000; model K-8, a five-place plane equipped with Edo floats and three Kinner engines, will sell at \$32,000. The present factory capacity is six or seven planes per month.

AVIATION April 3, 1930

AVIATION April 3, 1930

LINCOLN

AT LINCOLN, Mo., the Lincoln Aircraft Company will continue to produce their well-known line of PT aircraft. The original PT equipped with a rebuilt OX-5 engine will sell for \$1,250. The Lincoln PTK powered with a Kinner engine will sell for \$3,865, while the PTW, equipped with a Warner engine, will sell for \$4,315. All of these models carry a Department of Commerce approved type certificate.

LOCKHEED

LOCKHEED AIRCRAFT CO., Burbank, Calif., continues production of the four- and six-passenger Vega, the four-place Electra, and the new four- and ten-place Super low-wing monoplane. All four models have Wasp engines, and are priced between \$34,500 and \$10,250. The characteristic Lockheed construction with cantilever wing and plywood monocoque fuselage is, of course, continued.

The factory at Burbank, Calif., now has a capacity of twelve planes per month, and a policy of two-week delivery has been adopted so that finishes and painting can be applied to individual purchases.

MICRO-PLANE

IN ADDITION TO continuous production of the standard line of Micro-Planes, Irwin Aircraft Co., Sacramento, Calif., will introduce a new model designated as F-A-1. It is a one-place open biplane, powered with the Irwin four-cylinder radial 20 hp. engine, said to give it a top speed of 85 m.p.h. The plane sells for \$1,165.

MONOCOUPE

MONOCOUPE 90 is the designation of the latest product of Monocoupe Corp., Peoria, Ill. It is a two-place high-wing cabin monoplane, using the Lambert R-260 95 hp. engine. Features are tapered wings, brakes, navigation lights, optional cockpit enclosure, and high speed of 120 m.p.h. The price is \$3,375, and delivery will be made after April 1.

Four other models are outlined in production. The Monocoupe is a two-place cabin monoplane, using Viatore M5 engine, selling for \$3,850. Monocoupe 65 is a sport model with the same engine, same price. The Monocoupe, also two-place, uses Kinner or Warner Scarab engine and has higher performance. The last model in the Monocoupe line is the Monoscooter, a four-place dual control plane with Wright J-6 engine, selling for \$8,250. Its high speed is 135 m.p.h., and cruising speed 112 m.p.h. All of these machines are high-wing cabin monoplanes.

MOTH

MOTH AIRCRAFT CO., St. Louis, Mo., is offering for 1930 a sport version of their well-known model, carefully strengthened with handwelded, riveted, wood-spar special underslung model, and front cockpit, etc. The front cockpit is built to open and close, and a flexible windscreen fits so that a passenger may be seated. There is a spacious large baggage compartment. Color combination is optional, and the price, \$5,500. The standard model Moth is changed very little in appearance, but the fuselage has been strengthened by the use of

stronger tubing and additional heat treatment, and there are a number of minor refinements. It sells for \$3,960 flyaway St. Louis, Mo., with Gipsy engine.

OSPREY

OCEAN AERONAUTICAL CORP., Inglewood, Calif., will continue to produce the Oregon Osprey, a six-place tri-engine cabin monoplane. This plane is powered with three air-cooled liquid engines. It will sell for \$18,000, fully equipped including motor, wheel braces and instruments. Production for the coming year will be oriented on the Osprey, while design research will be started on a small three-engine monoplane of unique design, using two 115-hp engines.

The company also plans to continue production of its Continuous Wheel Gear. Many of these have been installed during the past year and it is expected that they will become increasingly popular this year.

PARKS

PARKS AIRCRAFT DIVISION of Detroit Aircraft Corp. is manufacturing for general sale those models of the three-passenger training plane which was developed for the use of Parks Air College. The price is \$3,163 with OX-5 engine, \$6,000 with Anselin, and \$6,350 with Wright J-6 165 hp. engine. The machine is a single-seat open cockpit biplane, of conventional construction. It is now being manufactured in plant No. 4 of the Detroit Aircraft Corp., in Detroit.

PHEASANT

PHEASANT AIRCRAFT CO., Fond du Lac, Wis., will have two models of the Pheasant Traveler in production this year. The one-place cabin model will sell for \$1,495, and the two-place cabin plane will sell for \$1,795. Both of these planes are monoplanes and are powered with flight engines manufactured by the company in its own plant.

PENTO

THE 1930 model PENTO is manufactured by Michawk Aircraft Corp., Minneapolis, Minn. It is a two-place, open cockpit, tandem, low-wing monoplane, designed and built to suit needs of private owners and businessmen. Manufacturing program for 1930 has just begun, and early delivery is expected shortly. A motorcar-like price of \$5,000 has been set on this model. This price will include brakes and other special accessories and equipment.

The plane is Kinner powered, and is equipped with strings to take off from sand or dirt without changes to the airframe structure. For training purposes the front cockpit is equipped with controls, adjustable rudder, elevator, inclosed, inclusive, oil pressure gauge. The rear cockpit has all motor instruments, compass, pitch indicator, air-speed indicator, starter, pressure gauge, and release handle.

PITCAIRN

PITCAIRN AIRCRAFT, INC., Willow Grove, Pa., will produce improved models of their standard mail planes during 1930. The principal changes in the new model are the use of round wing tips and a new type of balanced aileron. A sport model will also be produced for

private use. It will be a two place open cockpit biplane. For solo flying the second cockpit may be faired over.

PRUDEN-WHITEHEAD

AIRLANTS AIRCRAFT CORP., Atlanta, Ga., will produce for 1930 the Pruden-Whitehead plane. This plane may be used as a transport, for executives, or for wealthy sportsmen. It is an eight-place, tri-national, all metal, low-wing monoplane. At present, no price for this plane has been announced.

RYAN

A NEW RYAN DE LUXE BIPLANE is due from this year by Ryan Aircraft Corp., St. Louis, Mo., powered with a Wasp engine and selling for \$35,000. Like the standard model B-5, Brougham priced at \$12,250 with Wright J-6 300 hp engine, the new model B-7 has places for six. The company is also bringing out the Pioneers, a smaller plane of similar design, powered with a Wright J-6 225 hp engine and priced at \$10,000. The Ryan factory at present has a capacity of twelve planes per month.

SCOUT

PACIFIC AIR INDUSTRIES, Los Angeles, Calif., will manufacture the Scout monoplane. Three models will be built. The two-place Scout Junior, will sell for \$1,450, the four-passenger Scout Senior, will sell for \$2,450, while the Scout cruiser for pilot and six passengers will sell for \$4,300. These prices do not include engines.

SIKORSKY

SIKORSKY AVIATION CORP., Stamford, Conn., will commence production of the S-8 during 1930. This amphibious, using two Pratt & Whitney Wasp engines, is being widely sold throughout North and South America and the Hawaiian Islands. It is an eight-place, twin-engine, open cockpit monoplane and is equipped with the well-known Sikorsky features.

A new project to be undertaken by the company is the S-40, the largest amphibian in the world, which will be powered with four Pratt & Whitney Hornet Series B engines. Two of these have been ordered by Pan-American Airways for service between Miami, Fla., and Cristobal, Panama. The S-40 will be approximately twice the size of the S-8, and is designed to carry 41 passengers.

STINSON

SIX models will make up the 1930 line of Stinson Aircraft Corp., Detroit, Mich., division of the Stinson Motor Car Co., also owned by the same man. The feature model is the Stinson-Detroiter Junior, slightly modified from the 1929 version, equipped with Lycoming R-680 210 hp engine, priced at \$5,775. The Junior is also available with Wright J-6 225 hp or 300 hp engines. Stinson includes Edgair starter, metal propeller, and Kersey-Hayes wheels and brakes.

Two models are offered in the Stinson-Detroiter Senior type. This is a six-place plane with Wright J-6 300 hp or Wasp 225 hp engine. These are priced at \$10,495 and \$15,995 respectively. The overall dimensions

of the Wasp model are considerably larger than those of the Wright-powered plane, though the passenger capacity is the same.

The Stinson Co. is also about to introduce a ten-passenger transport plane, powered with three 210 hp Lycoming engines, to sell for \$33,000.

SPARTAN

SPARTAN AIRCRAFT CO., Tulsa, Okla., will produce a classificator for 1930, the first, a three-place open biplane equipped with a seven-cylinder Conquest engine, and will sell complete for \$5,625, the second, a C-3-365 model with a five-cylinder Wright engine, will sell for \$5,975. The last of the line, the C-3-225 model, powered with a seven-cylinder Wright engine, will sell for \$7,720. Spartan has also in preparation a four-place dual control cabin monoplane equipped with a seven-cylinder Wright engine which has a wing span of 30 ft. The plane will sell for about \$10,000.

SWALLOW

TWO ENTIRELY new models for 1930 are now being tested by Swallow Aircraft Co., Wichita, Kan. A single-seat, low-wing cabin monoplane is due to be ready for production by some time in March, and the Sparrowhawk model will be ready soon after that. These are three-place open biplanes built to use Kinner or Warner Scarab engines in the Junior model, and Wright J-6 225 hp engines for the Senior model. In addition to these new planes, the Swallow engineers will continue to build the well-known TP trainers, carrying OX-5, Kinner or Warner Scarab engines, with prices ranging from \$1,325 to \$4,600, and the Commander, selling for \$3,250 with Hispano engine and \$5,950 with Anzani engine.

TAYLOR

TAYLOR BROS. AIRCRAFT CORP., Bradford, Pa., will issue two planes in production during 1930. The first, a trimotor plane powered with a Kinner K-5 engine, 340 hp, or 375, equipped with dual control. The second, a sport machine, also powered by Kinner, lives at \$4,500, equipped with bimot. brakes, dual control and instruments. The company also expects to have a four place plane powered with a Wright J-6-3 ready for government test about July 1.

TRAINAIR

MERIAMS & BATES, Inc., Buffalo, N. Y., will put into production during 1930 a new "Trainair," powered with a Kinner engine and priced at \$4,075.

The company will also continue to manufacture three-place open biplanes with Anzani, Kinner, Wright J-6 165 hp or 225 hp engines. In addition, there is a new model with a 140 hp Aer engine, and minor modifications in design.

TOWLE

TOWLE AIRCRAFT CO., INC., of Detroit, Mich., for 1930 includes five place amphibians and eight-place flying boats. They are both of metal construction, Alital being used throughout. The planes are powered with two Wright engines of 225 hp each, located above the metal

wings. These wings are of full monospar construction. Holes are of the double type. The landing gear is a hydraulic, power-operated mechanism. In flying position the landing wheels are enclosed in the floats to decrease drag. A price of \$25,000 is placed on both of these planes.

TRAVEL AIR

TWO new models have been announced by Travel Air Manufacturing Co., Wichita, Kan. A four place cabin monoplane, powered with Wright J-6 225 hp engine, will be known as model 10-A. It is essentially similar to models A-6 A and 6,000 lb. powered with Wasp and J-6 300 hp engines respectively, which were produced last year. They will be continued, selling for

WACO

SHORT, WACO, will continue the line offered by Waco Aircraft Co., Troy, Ohio, for the coming season. COX and Hispano models remain for 1930, and, just recently, two new ones made in the plant using Wright 165 hp engine. There will be minor improvements in the Wright J-6 225 hp straight-wings and Taper-wings. In addition to continuing production of these widely known machines, the company will introduce a new three place model using a 400 hp air-cooled engine, and featuring Bredt wheels and finless, with a tail-skid instead of skid. No price changes have been announced.

Engines

ALCO

THE ALCO GIL TOOL CO., of Chippewa, Calif., is at present developing two engines which they hope to put into production during 1930. The first of these, an opposed eight-cylinder of 672-cubic inch capacity, will be well adaptable to ship installation.

The second, a 460-cubic seven-cylinder radial engine, with an overall diameter of 39 in., is now being built. It will be rated at 130 hp at 1900 rpm.

AXELSON

SINCE MARCH 1929 a new factory at Los Angeles, Calif., Axelson Aircraft Engines Co. has a potential capacity of 300 engines per month. At present, however, only streamline aero and being filled. The company continues to concentrate on the model AII air-cooled cylinder radial, rated 150 hp at 1,800 rpm. The price is \$2,900 in the factory. A feature recently introduced is the "pump-back head," a special arrangement of cooling fins over the cylinder bank. The engine has been given Approved Type Certificate No. 16.

BLISS

EW. BLISS CO., of Brooklyn, N. Y., will produce their Jupiter engine during 1930. This engine, which develops 325 hp at 1,800 rpm, will be produced in the direct, geared, and the supercharged editions. All of these engines will be produced at various contractual rates.

CENTURY

CENTURY REACTOR MOTORS CORPORATION, of Cranberry, N. Y., will start manufacture of the Century 4-inches 100-hp, 1930 rpm air-cooled engine. This engine has a bore of 4 in. and a stroke of 3 in. Its displacement is 318 cu in with a compression ratio of 5.5 to 1.

Standard equipment on this engine will include an automatic supercharger, electric starter, generator, and

two Seiss-Era magneets, with an overhead cam drive. The production schedule is two engines per day, from the first day of May, 1930.

BROWNBACK

THE LIGHT MANUFACTURING AND FOUNDRY COMPANY has proceeded with their program as originally outlined. The plant is operating daily and production on a quantity production basis is proceeding. At present two engines per day of the five engine per day capacity are being built.

CIRHUS

AAMERICAN CIRRUS ENGINE CO., Marysville, Mich., The American Cirrus engine will be continued in production throughout 1930 without change. Aside from the features that have already been incorporated in the American Cirrus, the company does not expect to make further changes in the engine itself.

As an optional extra, the company will equip the American Cirrus engine with a De Palma supercharger. Another development of this company during 1930 will be the American Engine, which will be an inverted De Palma supercharger as extra.

The company will undertake during 1930 extensive research and development in gear reduction for the American Engine.

CHEVROLET

Production of the "Chevrolet" four-cylinder in-line, inverted, air cooled motor built by the Chevrolet Aircraft Corporation of Baltimore, Maryland, will begin sometime during the early summer, probably during the month of June. First experimental tests are now being run and the preparation of production tools, etc. is being completed. The number of motors to be produced in 1930 will depend a great deal on cause on the demand, and general conditions within the industry.

The motor was very well received by the various manufacturers of aircraft at the show in St. Louis and

the company has every reason to expect a very nose volume of business.

Tests run on this motor since the St. Louis show have shown the power output of the Chevrolet motor to be in excess of previous estimates. At 2000 rpm the output is 100 hp., and at 2000 rpm, it is 110 hp. The previous estimate was 90 to 100 hp. at the same speeds.

ARTHUR CHEVROLET

This concern will develop two engines, a 4-cylinder and a 6-cylinder, which are inverted, air-cooled in-line models. Both engines have a bore and stroke of 4½ by 6½. The 4-cylinder has been rated at 90 hp. by the Department of Commerce, after being put through the regular Department engine tests, and has an approved type certificate.

The 6-cylinder engine has not been allowed to the Department of Commerce as yet, but will be very shortly.

The 90-hp rating is at 2,000 rpm, but the engine will develop 120 hp. at 2,250. The weight will be approximately 340 lbs.

COMET

THIS COMET ENGINE CORPORATION, which offers the Comet 7 cylinder, air-cooled, radial engine, is now located in Madison, Wisconsin, and completely equipped with new production machinery, jigs, dies, and fixtures, installed in a new, modern factory. Manufacturing operations on the Pacific Coast, where production of the engine was originally started, have discontinued although service parts and personnel are still maintained at the old address.

The design of the engine remains essentially unchanged although minor refinements have been incorporated.

As a result of improved manufacturing economies and the simplified design of the engine, it has been possible to reduce the price from \$3500 to \$3700 with corresponding reductions in cut prices to manufacturers.

Due to a slight improvement in the cam design, the manufacturers are applying to the Department of Commerce for a resulting 140 hp. at 1,900 rpm for this power plant.

DAYTON

CONTINUOUS SUCCESS from the angle of production and sales, 1939 promises to be the most prosperous year the Dayton Airplane Engine Company has ever known.

Although the Dayton Bear engine has been on the market for some time, the efforts of the company have been largely devoted towards experimentation and perfection of this 4-in-line, air-cooled engine. The officials of the company have withheld large scale sale and production until their engine was given every test. Under the supervision of E. Don Williams, chief engineer, the Dayton Bear has been tested and perfected. Mr. Williams now has charge of large production which is well under way.

The Dayton Bear is of the 4-cylinder, air-cooled type, generating 110 hp. at 1900 rpm. It has been granted Department of Commerce Certificate No. 11.

The engine is now being sold at \$750. Quantity production has made this reduction possible.

CONTINENTAL

AT present the Continental Aircraft Engines Co., a subsidiary of the Continental Motors Corporation, is planning a vigorous production program for 1939.

Three model A20 engines have been running as break down tests for the last few weeks. Up to date, they have completed 25 periods of 25 hr. each of continuous running. These engines are operating at full throttle all the time.

While Continental is now in production on the model A20, their activities will not stop with this design. Design and experimental work are being conducted on other models of various types and, when found adequate, will be added to the present production.

GENERAL

GEORGE AIR MOTORS CO., Scranton, Pa., will produce four and seven-cylinder conventional, radial air-cooled engines during 1939. The five-cylinder engine is rated at 380 hp. at 1900 rpm, while the seven-cylinder engine is rated at 250 hp. at 1900 rpm. Both power plants have a 5-in. bore with a 5½-in. stroke.

One of the special features of this engine is the valve arrangement. Two intake and one exhaust valve per cylinder actuated by a single intake and a single exhaust push rod, incorporate an intake valve design similar to the two intake rocker arms. Employment of a two-way intake pipe permits exceptionally low barrel head temperatures.

Drawing, patterns, castings, dies and forgings are complete, with some machinery ready for production on the five-cylinder engine. Work on the seven-cylinder engine is progressing very rapidly. Many parts are interchangeable with the five-cylinder engine.

HURRICANE

HURRICANE MOTORS CO., Inc., of Houston, Texas, will get into production on their new engine this year. Their production schedule calls for the manufacture of two engine per month. At present the officials of the company are waiting for the engine to receive an approved type certificate before undertaking further production.

The company will also build a few experimental glider engines during the coming year.

KINNER

THE THIRD QUARTER of the year 1938 marked the entry of the Kinner Aircraft and Motor Corporation upon a program of quantity production, resulting in the shipment of a total of 837 K-3 100-hp. engines during the year. In Jan. and Feb. of 1939, 42 engines were shipped off by the company, as compared with 14 during the same period in 1938. The present indication is to the effect that approximately 70 engines will be shipped in March, which will compare with 28 shipped during March, 1938.

Due to the great difficulty which was encountered in securing the necessary automobile machinery, produc-

tion at the Kinner plant last year was delayed until the third quarter. Now the machinery has been installed. With its present equipment, the company is thoroughly capable of producing as many as 480 of the 100-hp. engines and 100 of the 75-hp. engines per month.

The production program for the year 1939 contemplates the production of 1,500 of the 100-hp. engines and 500 of the new 75-hp. engines. In event, however, that a heavy sale of the 75-hp. engines in an amount greater than our motors over that which we have estimated, our production can be materially increased upon very short notice and with practically no delay.

LAMBERT

THE LAMBERT ENGINE CO., for 1939, will produce two engines. They will continue production on their popular Vega M-5, and will place in production their new Lambert Model R-366.

The Vega M-5 is the engine which is now used quite extensively in the industry. This engine will be continued with minor improvements.

The new R-366 is a larger engine than the Vega M-5, and has an overall diameter approximately the same as that of the Vega. The new R-366 incorporates many ingenious mechanical principles. It will sell for \$1,450 F.O.B. the Milwaukee, Wis., factory.

LYCOMING

THE LYCOMING MANUFACTURING CO., of Williamsport, Pa., have a production program scheduled to start March 1. At the present time their factory is toolled up to produce ten engines per day. The Stearman Aircraft Corporation, another Cord subsidiary, have placed an order with this company for 500 of their engines.

Later in the year the company expects to announce production plans for their new series engine, known as the series 100, their present engine being a nine-cylinder air-cooled radial developing 210 hp. at 2,000 rpm.

Officials of the company report that they are much encouraged over the outlook for the aviation production this year. They report that they firmly believe that those plane manufacturing companies that produce planes on a production basis, properly priced, will enjoy a satisfactory volume of business.

The company does not intend to announce any price on its engines, preferring to quote a price to each individual prospect according to the number of engines for which he will place an order.

MENASCO

MENASCO MOTORS, Inc., Los Angeles, Calif., will commence production during 1939 on their "Piranha" engine. This engine is a four-cylinder, in line, inverted, air-cooled engine, rated at 90 hp. at 1800 rpm, by the manufacturer.

At the present time there are no figures or data obtainable on the company's plans for production during the coming year. No changes are anticipated in the engine.

MAC CLATCHIE

THE MACCLATCHIE MANUFACTURING CO., of Compton, Calif., will continue to build their Panther engine. This engine is of the L-head radial type. The engine

develops 150 hp. at 1,900 r.p.m. and has an overall diameter of 38 in.

The first series of a \$200,000 plant has been completed and has been completely stocked with the most modern tools. Straight line production on a large scale is planned for 1939.

The engine has completed its 50-hr. test in Washington, and after a 30-hr. test flight will have an approved type certificate.

PRATT & WHITNEY

THE PRATT & WHITNEY AIRCRAFT CO., of Hartford, Conn., will build just as many Wasp, Wasp Junior, and series R aircraft engines as the industry demands. The company's present production schedule calls for 150 engines per month.

With production started on the new Janssen it is expected that number of engines built per month will rapidly increase.

SIEKELY

THE SIEKELY AIRCRAFT AND ENGINE COMPANY of Holland, Michigan, have been developing light, radial, air-cooled, aircraft engines for the past three years and, with the increasing interest in the development of a light, inexpensive plane of comparable low speed built around a low horsepower unit, the company has installed definite production facilities to turn out a large volume of light aircraft engines during 1939.

WARNER

RESEMBLE large constraints for engine shipment at this time of the year is the experience of the Warner Aircraft Corporation of Detroit, Mich. With the uncertainty that exists in the manufacturers' needs, they are placing orders for engines as they are needed from month to month instead of, as in the past, from year to year.

Due to these conditions, the Warner Aircraft Corporation is planning a minimum production for the series of 500 7-cylinder, 210 hp., "Spartan" engines. They are also planning a minimum production of 250 5-cylinder, 80-hp., "Spartan Jr." Should the demand exceed this production, they have the facilities to increase their output to the desired series.

WRIGHT

THE WRIGHT AEROMOTIVE CORPORATION of Paterson, N. J., are planning for an increase of 15 to 20 per cent over their business in 1939. At the present time they report that contracts are coming in at a satisfactory rate, and the seasonal schedule is under way. Shipments for the first three months of 1939 have been steadily on the increase, which the company takes as evidence of the fact that aircraft are moving to the ultimate user, and that the manufacturers are becoming more optimistic as spring orders are received. The Wright Co. are looking forward to a good business in their new 575-hp. Cyclone engine during 1939, in addition to the 250-hp. Cyclone on Government order for this year.

They expect to do an approximately even amount of business in the three divisions of their Whirlwind class engines.

GENERAL NEWS

BENNET F. POWELL, News Editor

January Exports Valued at \$598,403

Drops in Export Shipments For January-February 1930

WASHINGTON (c)—January exports in aircraft represented \$598,403. Exchange of planes and parts from this amount is divided into seventeen planes for \$294,000, 29 engines worth \$200,346, and parts and accessories, amounting to \$104,057. Total January imports were valued at \$46,000, power plants for \$600, and parts and accessories valued at \$25,290; while Penns. Boys was sent one engine for \$12,472 and parts and accessories totaling \$2,320.

During February, 1930, plane exports had a valuation of \$109,200, while during the same month in 1929 the figure for this class was \$122,072. Twenty-one aircraft were shipped during January and January-February this year and last. In 1929, though, 353 aircrafts were sent with \$460,500 as against \$415,863 in 1928.

Imports in Accessories

The value of parts and accessories sent out of the country during January-February, 1930, was more than double during the same period in 1929, for the corresponding imports last year reached \$45,152 and this year and only \$16,245. For two years, it is found, total exports were valued at \$141,434 in 1929, and \$102,362 in 1928.

A decline of approximately 50 per cent in exports of engines for the first two months of 1930 as compared with the last half of 1929 is noted but last year a wider gap between the two periods was noted. During 1929, 50 power units, or nearly 30 engines, worth \$111,461, were shipped this way. In February of this year nine power plants representing \$30,712 were shipped, while in Feb. 1929, 29 engines, totaling \$15,498 were exported.

A detailed list of plane, engine and accessory shipments for the month of January, 1930, follows:

Exports in Planes

Curtiss biplane

Curtiss triplane

De Havilland plane

Douglas biplane

Douglas triplane

Cincinnati Show Concluded April 1

Opened in the Music Hall March 26; Meetings & Features

CINCINNATI SHOW (cont.)—This year's first annual aircraft show came to an end on April 1, after running until March 26 at the Cincinnati Music Hall. The exposition was directed by George Redmond.

One of the features of the show was the "Pitts-Taylor" plane built by the Aircraft Appliance Co., Springfield, Ohio, which was exhibited by Wright Field. The machine is used for pre-flight instruction of prospective pilots. Another feature of the exhibition was the "Thomas-Morse" observation plane, modified with floats, machine guns, a radio set, and an aerial profile picture camera. Several other displays also demonstrated crew and accessories used in the present day.

The new Cessna single-place biplane, constructed by the Cessna Aircraft Co., Columbus, and powered with a Cessna Model 350 four-cylinder in-line engine, was given a special display. Started from the design of a racing seaplane was the Autocross, a craft developed by the Autocross Corporation of Atlanta. E. L. Hufcik's Triplane participant was another local product on view.

Other Planes Displayed

Other planes on display included the Bader (Ind.) biplane, a three place Waco powered by a Franklin six-cylinder engine; the new Cessna Model 350 monoplane of the Menlo Aircraft Corp., Cleveland; the Monogram, of the Mono Aircraft Corp.; a Fairchild monoplane displayed by the Embrey-Riddle Co.; a Cessna open-cockpit biplane; and a Waco biplane exhibited by Lorimer Aircraft, Cincinnati's mounted pilot.

A number of gliders shown included those of the Automotive Trade School of the National Automobile Chamber of Commerce, the Northern Kentucky Aero League. The trade school had in addition, a comprehensive display of power planes and parts.

An elaborate exhibit was that of the Baldwin & Clark Lockheed, occupying an entire side of the north wing of Music Hall and designated as the "Bureau of Transportation." This exhibit featured different regions and areas of various transportation fields from earliest times to the present.

Some Industrial Exhibits

The more than one-hundred other industrial exhibits included the Bellanca, Light Co., B.H.A. Arms, Buhl Co., Lubrizol-Aviation Oil Co., Prospex Fire Extinguisher Co., Albrecht Company, Crown Gasket Co., Aerostar Helicopter Co., Canadian Aircraft Supply Co., Columbia Manufacturing Co., Darr Windmill Co., The Douglas-Hedley Lumber Co., Seiber-Gosman Co., Johnson Motor Co., Diversified Underwriters Co., The Pressed Equipment Co., The

Plymer Manufacturing Co., Black & Decker Manufacturing Co., C. & D. Auto Supply Co., Albrecht Industries, Inc., The Blue Chip Co., Cessna Aircraft Manufacturing Co., Ferris Paint Co., Central Alloy Steel Corp., Kendall Refining Co., George B. Werner Co., G. B. Fowler, The Kehler-Koest Manufacturing Company, The Commercial Gasket Company, Commercial Aviation Activities, Cincinnati Automobile Club, and the University of Cincinnati Engineering Department.

The Technical Offset Shows were held in the Music Hall during the show. Its last show day at the Hotel Stevens-Cannizaro. Among the speakers and their topics were the following: Earl C. Smith, General Sales Staff Co.; C. N. Williams, Western Electric Co.; "Aircraft Radio Components," M. T. Clark, Transair Steel Co.; "Boeing Construction Features," D. R. Richardson, Beechcraft Sales Co.; "General Metal Co.," W. C. Johnson, General Metal Co.; and the National City Bank.

Having secured the necessary banking funds, this means that the International Zeppelin concern chartered line charter to New York. The first flight will be to ride up planes and radios remaining to be completed before ships are built and the cross-seas route started.

Not American Name

It is understood that安排 for the service of the Zeppelin airship in America will be Germany and air to be made larger than the Graf Zeppelin. The Goodyear-Zeppelin firm will be unable however to commence work as craft for research purposes until it has located its two hangars for the United States Navy.

Dr Hugo Eckener, head of the Zeppelin Luftschiffbau of Germany, is now in the country and plans to visit Baltimore and Philadelphia. He will travel around the locality notable to become the American base of the airship line. His decision that points further north would not be feasible owing to unfavorable weather conditions. Several States have been seriously considered in the Eastern section.

Although none had already planned a place, however, all had expressed a desire to do so through previous trips taken. All plans had last three days been搁浅.

[Satisfactory completion of the negotiations will be dependent upon the fact that there is no amalgamation of women. These have been several instances of men leaving to fly in a day. Last in 1934, Max Siedel, president of the Goodyear company, left to fly in that short time following a merger with Frederick Handley Page and several years later, James C. H. Hobson, president of the Engineering Department, Aerostar Research, sailed after some three hours of instruction.—ED.]

Some Other References

The most recent agreement was entered into by Charles E. Mitchell, director of the National City Bank board of directors; Dr Hugo Eckener, Col. E. A. Davis, chairman of the executive committee of U. A. T. and S. Co., and Dr. J. W. L. Litchfield, president of the Goodyear Zepplin Corp. and also of the Internatinal Zeppelin Corp. F. W. von Moltke, of the Maybach Motors Company of Germany; and other important officials

New Stock Offered By Schles-Bach Firm

DETROIT (UPI)—Schles-Bach Detroit Corp., manufacturers and flash distributor in this section of the United States, is offering a new stock issue of 75,000 shares of class A per person, and 75,000 shares of class B per person, at \$100 per share, or a unit comprising one share of each class stock. The purpose of the new corporation, Edward F. Schles, said, is to organize a strong sales organization and to carry on development work on existing products.

It is the plan of the company to operate as aviation school under the direct supervision of William S. Brodin. The low-cost training course consists of 100 hours of classroom work, 80 hours of adjusting Detroit City Aeroplane, while a new service and machine shop building, 140 x 32 ft., is now being built. In addition to the property, which lies to the north and west of the plant, the corporation owns property at the west end of the eastbound leg, fronting 625 ft. on the expressway and 152 ft. in depth.

Sabre Aircraft, Inc., is completing arrangements for the manufacture of aircraft for light training planes manufactured in Memphis. An announcement concerning this is expected to be made during the Detroit Show, April 5-10.

With the new financing plus the company will have an authorized capitalization of 100,000 class A shares and 250,000 class B shares, 250,000 shares of the total being outstanding. One-half of the stock will be held by the corporation and the other half will become treasury stock. The Pilgrim Trust Co., Detroit, has been named transfer agent and the Detroit & Social Trust Co., registrar.

More States Approve Riders

WASHINGTON (AP)—Four more states have approved the use of insurance riders excluding ratio insured in aviation. Deputy Attorney General Howard D. Brown, representing the Pennsylvania insurance commissioner, Matthew H. Tufts, has the right to approve such healing clauses. Provisions providing that except in the case of a complete or permanent disability, which necessitates payment of the policy's reserve, are contained in South Carolina and Arkansas. Though opposed to restrictions on riders, North Carolina's insurance commissioner, Alex C. Boney, declares she prefers to such riders because the insurer is more easily recovered.

Meanwhile the same opinion is held by W. E. Pyle, state insurance commissioner of Mississippi, who has suggested to insurance agents in his state that they not accept such riders. However, he will oppose the use of policy riders denying insurance companies loss ratio risks, except to the extent of paying the reserve if death is due to a mailing in an automobile accident.

Meanwhile, the Marine-powdered Keystone, passenger car, auto, oil, tire, insurance data are to be furnished by the Keystone company for a total cost of \$2,200,000. The money for these contracts is to come out of the Air Corps appropriation for the fiscal year ending June 30, 1939.

Clarence Chamberlin's New Cabin Plane Tested



These planes were recently exhibited at the Jersey City (N. J.) airport on the Cessna Model C81 which provides for 200 ft. of baggage, cabin interior, developed by the Cessna Company of the Chamberlin Corp. The C-81 has accommodations for eight persons and is designed for either the Wright J-6 or Pratt & Whitney engines.

The plane's span is 46 ft. and the overall length 26 ft. 11 in. Weight

copy is 2,340 lb. and gross weight is 4,400 lb., giving a useful load of 2,000 lb. which provides for 200 ft. of baggage, cabin interior, developed by the Cessna Company of the Chamberlin Corp.

On the new cabin plane the company will have an authorized capitalization of 100,000 class A shares and 250,000 class B shares, 250,000 shares of the total being outstanding. One-half of the stock will be held by the corporation and the other half will become treasury stock. The Pilgrim Trust Co., Detroit, has been named transfer agent and the Detroit & Social Trust Co., registrar.

Curtiss and Keystone Get Air Corps Contracts

WASHINGTON (AP)—Contracts for aircraft maintenance and repair work for Air Corps by the Curtiss Aeroplane & Motor Co., Buffalo, N. Y., and the Keystone Aircraft Corp., Bristol, Conn.

The Curtiss firm will furnish 50 to 125 attack planes, 160 seaplanes of the D-L-2 type and spare parts which cost is worth \$1,200,000. Work will begin on the production immediately and final deliveries will take place in April of 1940.

Meanwhile, the Marine-powdered Keystone, passenger car, auto, oil, tire, insurance data are to be furnished by the Keystone company for a total cost of \$2,200,000. The money for these contracts is to come out of the Air Corps appropriation for the fiscal year ending June 30, 1939.

Wyoming Gas Tax Protected by Boeing

SEATTLE (UPI)—Through Boeing Air Transport put the fear-stricken oil refiner gas tax on gasoline bought in Wyoming during October, it was done under protest, officials declare, and the state will be liable for costs.

Boeing's overwhelming economic dominance, contained in the Constitution, used to be violated through this practice. It was announced in November last week [p. 953] that Boeing had started negotiations with the state to eliminate the burden of the Nielsen tax, which does not stamp aviation gas from taxation, since it may locate in Omaha, Neb., on the low side of the Missouri River, it is claimed, as a move would save the company \$600,000 a year.

More agitation concerning the gas tax on aviation fuel has been stirred by the state of Wyoming. Yesterday, Dale Anderson, the president of that company, Frank Phillips, either a twelve-cent charge should be shaved and the money spent exclusively on energy and airport improvements, or aviation should be entirely exempted from the tax.

Bigin Chevrolet Production

INDIANAPOLIS (UPI)—Chevrolet Motors, Inc., has a new production of 125 of the Chevrolet engine. The 124, five-cylinder inverted air-cooled in-line gasoline-type engine, will run at 3,600 rpm and will develop 50 hp at 3,600 rpm. Arthur Chevrolet is president.

Air Corps Exercises To Feature Photography

WASHINGTON (UPI)—During the operations of the Personnel Wing around Sacramento, Calif., April 1-26, a photographic competition will be held. All members of the Air Corps will participate, and photographic missions are to play an important part.

Special photographic planes will be employed by the Air Corps for observation, aerial photography, aerial mapping, and aerial survey. These operations will bring into play not alone standard photographic observation equipment but also experimental types including the Air Corps' latest development, the camera, the all-silence type of which covers more than three thousand square miles in single exposure from an altitude of 35,000 ft. At 20,000 ft. the same camera takes a photographic enlargement 400 times larger than the original. The plane used for this purpose has the shape of a Martinet Cross and the area covered is 25 sq. mi. by 25 sq.

New Air Flashlight Book

There will be several night photo-missions made by the Air Corps in the first of the Army's latest flight-light hand lamps which throw a light equal to 5,000,000 candle power. These flights will be made at the altitude of 10,000 ft. in the dark of night. According to plans, commercial, racing and amateur hot air craft will be in production before the summer is over. The first one operates a daily mail trip passenger service between this city and Sacramento.

Work on Wodell Plant Sites

NEW ORLEANS (UPI)—Plans for the factory buildings which are to be erected at the Wodell Flying Service plant sites are being worked out at the present time.

According to plans, commercial, racing and amateur hot air craft will be in production before the summer is over. The first one operates a daily mail trip passenger service between this city and Sacramento.

Report Central Alley Earnings

MATTHEWS (UPI)—Earnings of the Central Alley Flying Service, Matthews, N.C., for the month of April in corporation were \$6,000,000 for the year 1929. Earnings for 1928 were \$4,962,348. The company reports assets as of Dec. 31, 1928, were \$45,433,333 as compared with \$74,927,338 for the year of 1928.

Bid on Purchase Slik for Navy

WASHINGTON (UPI)—The bid for the purchase of the Slik, a new type of flying boat, was let by the Bureau of Supplies and Accounts to fasten the Navy Department with \$10,000,000 of paraffine oil, white type, 40 per cent; Dupont Slik Corp., \$1,200,000; Henney, \$1,100; Schenckels, \$1,100; and Haleson, \$1,100.

Commercial to Try Kelly

SAN ANTONIO (UPI)—Ten planes graduated from commercial schools will be sent to Kelly Field and one cargo plane, three Attack Group, Fort Riley, Kansas, Galveston, Tex., commanded by Maj. John H. Kelly, will be sent to Kelly Field, San Antonio, 26 single planes and one cargo machine; Seventh Bombardment Group, Rockwell Field, San Diego, Calif., commanded by Maj. Carl Spatz, twenty men, two cargo planes, two cargo craft, and one transport, Second Bombardment Group, Langley Field, Virginia, commanded by Maj. Hugh J. Keay, sixteen bombers and one cargo plane; Third Attack Group, Fort Riley, Kansas, Galveston, Tex., commanded by Maj. John H. Kelly, will be sent to Kelly Field, San Antonio, 26 single planes and one cargo machine; Seventh Bombardment Group, Rockwell Field, San Diego, Calif., commanded by Maj. Carl Spatz, twenty men, two cargo planes, two cargo craft, and one transport, Second Bombardment Group, San Francisco, commanded by Capt. Walter H. Kress, seven observation planes and one machine of the cargo carrying type.

Plan Canada Travel Air Assembly

MONTRÉAL (UPI)—Plans to assemble Travel Air here are being prepared by Continental Aero Corp., Ltd., as disclosed by them this increased.

AVIATION April 3, 1930

■■■ NEW PLANES ■■■

Work is nearing completion in the Miami aircraft factory, this city, on a new biplane which is to be designed by Charles P. Strohbech, chief engineer for the Remond Aircraft Corp. The machine will have a center nacelle to which the wings are hinged and upon which the engine will be located. The power plant fitted with the NACA type cowling.

Frederick Brown, Spokane, Wash., has completed a two-place, all-metal cabin monoplane the Monocle, weighing 260 lb., and having a wing span of 20 ft. 6 in., a length of 20 ft. 6 in., and 4 ft. 6 in. overall height. The engine, a 60-hp. Cirrus, is to be used. Mr. Brown, who was previously flying for Remond, has been succeeded by K. B. Mann, president of the Monocle Air Transport Spokane.

Horatio Allard, consulting aeronautical engineer, designer, and builder, is constructing an experimental autogyro in Cleveland, Ohio. He is in association with the Powers Autogiro Co., of Philadelphia.

By Kyle Astorino, the D'Onofrio Transportation Co., City Island, N. Y.—Aeromarine boats are to be built at the Astorino boat yard at the Astoria boat basin. According to plans, commercial, racing and amateur hot air craft will be in production before the summer is over. The first one operates a daily mail trip passenger service between this city and Staten Island.

Editor

Opening at the Peet gliderport, a new field built by the Peet Glider Corp., New York, has been named at Fort Washington, L. I., and plans now call for quantity production of the craft. The gliderport is built of dural and has a capacity of 100 passengers. L. L. Lawrence, president of Wright, heads the Gliderport company, while Frederick Peet, designer of the craft, is vice-president.

There has been constructed in the shops of Texas Flying Service, Inc., Fort Worth, a memory glider built on the principle of the "flying carpet." The craft has been granted Texas Glider Permit No. 1 while it has also been classified by the Department of Commerce, experts state. The construction requires no engine or motor. The glider has a wingspan of 40 ft., a span of 32 ft., and wing sections weighing 80 lb. each plan to produce the glider on a mass-produced scale.

Rockwell Flying Bile

PHILADELPHIA (PA.)—The Edward G. Kelly Corp., of this city and Detroit, has entered the aviation field since being in production on its first order for rolls for airplane wings. These rolls are of stainless steel, electrically welded.

Sixteen Point Shop Burns

DETROIT (UPI)—An \$8,000 fire ruined the paint shop of the Strommen Aircraft Corp., Mayes, Mich., Saturday, March 29. Production, however, is not delayed by the loss.

AVIATION April 3, 1930

■■■ BRIEFLY ■■■

A bill in place to ban Allerton J. Wilts, recently assigned to the Navy school bat with the rank of Captain has been introduced in Congress by Rep. Senator Fitzgerald of Ohio. This has been done apparently to the fact that the Navy has failed to make up the reasons that it violates previous laws without sufficient reason.

Enough stock of Hydroline Brake Co. has been deposited in connection with acquisition of control by Remond Aviation Corp. to assure carrying out of the original plan.

Pushing planes will be used to eliminate induced birds of wild hawks in Oregon, if the U. S. Army birds return.

A Peet all-metal glider, which was built at Roosevelt Field, L. I., N. Y., on April 1, had its first flight from Long Island Sound at 10:30 A. M. on April 7 being made by a manboard for the first 4 min. In addition to a pilot, it carried two passengers and a total load of 400 lbs.

An aviation hospital will be given May 1 at the Willard Hotel, Washington, D. C., in connection with the annual meeting of the Chamber of Commerce of the United States. Speakers will be F. R. Strohbech, P. H. Russell, W. G. Herms, and Gen. John F. O'Rourke.

A bill to provide a state aviation code is to be introduced in the Senate by Senator Patric of Minnesota. It will be introduced in the Louisiana legislature under the sponsorship of the aeronautics committee of the Louisiana Chamber of Commerce.

An all-metal carrying a message from the Peet Glider Corp. of Mayes, Okla., for training students in aviation under the guidance of the department.

Kenneth E. Robinson, Mayes, Okla., has joined the ranks of school young guides at their student entrance.

MICHIGAN BOARD OF AVIATION has published statistics showing that there are more than 25 aviation schools operating in the state with 10,000 students, of whom 4,800 are actually receiving flying instruction.

STANDARD FLYING SCHOOL, Los Angeles, has inaugurated a course in train flight instructors. These regular courses last the maximum of 450 hours and include a transport pilot's license.

The Tandy Junior Aero Club, Tulsa, Okla., will conduct a ground school.

WILMINGTON HIGH SCHOOL, Wilmington, Del., will offer classes in flying, motor boat racing, and flight training at the student rates. The Auto Club of the school has bought and is assembling a glider.

TRANS AIRLINE CORP., Corpus Christi, Tex., has acquired eight planes for charter and for use at Waveland, liquid world audiences.

Dallas Aviation School, Los Field, Dallas, Tex., has purchased four Eaglecraft training planes and one Electra glider.

Wings Photo Service, St. Louis, Mo., is to make an aerial map of the city to

be about 16 ft. square, comprising 250 photographs.

W. P. THORSON CO., INC., Rockford, Ill., has recently organized as the Navy school bat with the rank of Captain has been introduced in Congress by Rep. Senator Fitzgerald of Ohio. There has been done apparently to the fact that the Navy has failed to make up the reasons that it violates previous laws without sufficient reason.

Pan American Airways has purchased a Curtiss Kingbird plane for use over the Andes between Santiago and Asuncion, Argentina.

Standard Oil Co. of Ohio has arranged delivery of a Waco-powered Standard plane.

KOOGY FLYING SERVICE, INC., Detroit, Mich., has recently organized, has changed its name to Michigan Aeroplane Corp., 12th Ave. Aircraft Corp., Lansing, Mich., has changed its name to Almonte Aeroplane Service Corp.

MEMPHIS AIRWAY, Newburyport, Mass., was scheduled to open a flying school April 1.

Schools and Colleges

ROOSEVELT SCHOOL OF AVIATION, Oakland, Calif., requires that students taking the limited commercial course must not only pass the test of the Civil Aviation Commission but also pass the practical examination given by the school.

CONCORDIA AIR COLLEGE, Kansas City, Mo., announces that it will open a branch at Trenton, Mo., as the first step in a plan of establishing terminals throughout the country, negating cities whenever a sufficient enrollment can be secured.

GREAT NORTHERN AVIATION SCHOOL, St. Paul, Minn., has been opened by Frank D. Dill, Dill Aviation Co., Inc., for training students in aviation under the guidance of the department.

KENAI AVIATION SCHOOL, Kenai, Alaska, has joined the ranks of school young guides at their student entrance.

A glider race was held March 29 at the Peet Gliderport, the winner of the Kappa Alpha chapter.

The Bay Minette (Ala.) chapter of N.A.S.A. has moved into new quarters on the top floor of the Observatory Building.

According to present plans, the new flying school will be for planes using Curtiss engines, sponsored by American Airlines, Inc., and the school will be located in the city of 450,000 people and a transport pilot's license.

THE TANDE JUNIOR AERO CLUB, Tulsa, Okla., will conduct a ground school.

TRANS AIRLINE CORP., Corpus Christi, Tex., has acquired eight planes for charter and for use at Waveland, liquid world audiences.

Dallas Aviation School, Los Field, Dallas, Tex., has purchased four Eaglecraft training planes and one Electra glider.

■■■ TRADE TIPS ■■■

It has been reported that

that the new airport, between New Orleans and Plaquemine, Louisiana, or Port Eads, La., between July 1, 1930, and June 30, 1931, will be opened at the Office of the Second Assistant Adjutant General, Washington, D. C., April 25, 1930.

Sky Spa Co., Inc., operator of an airport at Santiago Springs, N. Y., wishes to make arrangements with some company which will be the part for傷害者 to help to build and maintain the airport during the coming season. Address James C. Macmillan, 143 Half Way, Santiago Springs, N. Y.

CITY OF DALIAS, Miss., will spend \$10,000 for improvements to the Williams-Johnson municipal airport in Converse, Texas, this summer.

FAIRFIELD CAPITAL AIRPORT, Grand Rapids, Mich., has a Flying School, Battle Creek, Mich., are at the market for a number of training planes.

CORBETT FLYING SCHOOL, Kalamazoo, Mich., and Barnes Flyer, Detroit, Mich., are in the market for purchases.

NATIONAL AIRWAYS, INC., Detroit, Mich., is considering construction of flying airports in the vicinity of the airport.

ROBERT FIELD, Traverse City, Mich., will soon build hangars.

SCHWEIDLER AIRPORT, Minneapolis, Minn., is in the market for airport equipment.

TEL-CHAMBER, Chamber of Commerce, Grand Haven, Mich., wants airport equipment to do work at Grand Haven Airport.

H. E. ADDITIONAL INFORMATION CONCERNING STATE PLANNING AND TO JOIN IN STATE PLANNING is invited to join in State planning board.

New Firms Announced

GOULD EAGLE AIRPORT, INC., Cincinnati, Ohio, received 250 shares as no value stock, by R. G. Bentz, Jack Holt, John J. Sanders, and Arnold Wright. The company was formerly located at Ingleside, Calif., until 1928.

GOULD FIELD, Gould Field, Ark., by Dr. R. H. Henschen, Vincent Schmitt, and Jack Henschen, to engage in school, passenger, and tour service.

L. S. AIR MARTIN, INC., Boston, Mass., N. Y., engaged in early morning flights, and flight training at the student rates. The Auto Club of the school has bought and is assembling a glider.

AMERICAN AVIATION SERVICE, INC., 116 E. 39th Street, New York, N. Y., recently organized under Delaware laws, registered \$10,000 stock at \$100; Max Kuhn, president.

■■■ PERSONNEL ■■■

Louis J. Karatz has been appointed general manager of Continental Motors Corp., Detroit, Mich.

ALAN BOYD and WILLIAM HAMMERS have been made inspectors for the Aeromarines Branch, and are stationed at Detroit.

ORCHIS W. LEWIS, recently director of advertising and sales promotion, has been made vice-president of Treco's Steel Co., Youngstown, Ohio, manufacturer of airplane hoppers and other products.

HENRY H. BLAUM, director of the aerospace development division, Aeromarines Branch, has been appointed chairman of a committee to present the position of assistant chief manager of Pratt & Whitney Aircraft Co.

W. D. YOUNG has been placed in charge of the newly opened Treco's (Artis) office of Standard Airlines at 59 Pennsylvania St., New York.

C. H. HARRIS has been appointed supervisor of the Thompson Aerocastrol Corp. repair shop at Peoria, Mich. W. E. Clegg, assistant secretary and treasurer, has been elected to the board of directors, and has positive support of O. J. Gossman, former owner.

RAY G. SCHAFFER has been made general manager of International Airways, Inc., Curtiss-Wright Field, Elkhart, Ind.

LEROY T. McCORMICK has been promoted to Captain of Curtiss-Wright & Marine Co., Gardner City, Ia., N. Y., at Art Corp. representative.

MAT. W. F. CENTER, superintendent of Port Columbus (Ohio), has been made commanding officer of the 10th Flying Observation Group.

WALTER R. REED, Jr., has been made traffic manager for Universal Division of Aeromarines, Inc., at St. Louis, Mo.

P. M. SMITH, formerly with Mach Aerospace Co., has been named general manager of Buckley Aerospace, Wichita, Kan.

MAT. G. H. ERICKSON, formerly vice-president of Curtiss-Wright Flying Service of New England, has been appointed eastern representative of Shell Oil Co.

KENNETH M. ROSS, formerly chief engineer of the Warner Aerocastrol Corp., Allentown, Pa., has been named chief engineer of the Warner Aerocastrol Corp., Alliance, Ohio, successor to Alliance Aircraft Corp. J. D. CARRETT and A. EDWARD KELLY, who formerly were with Sheehan, have been made vice-president and secretary, respectively.

FRANK W. GARNER has been placed in the board of directors of Detroit Aircraft Corp.

G. N. WEALES has been made superintendent of Douglas (Artis) managed airports, succeeding B. R. Ropponen.

ROBERT L. HEATH, superintendent of U.S. (N. Y.) managed airports, has been appointed to the committee on services and storage of the Aeromarines Chamber of Commerce.

R. J. KAY has been appointed sales manager of Pioneer Instrument Co., Brooklyn, N. Y.

ROBERT J. JONES has been made a member of the Pacific division of the

glossary board of Aircraft Resource Board of America.

JOHN C. HARPER has been promoted to the position of assistant chief manager for AC Spark Plug Co., Peoria, Ill.

EARL B. BREWER has been made manager of Union Airport, Louisville, Ky., for Bell Aeromarines Corp.

A. R. BLAKE has been promoted to the position of assistant chief manager of Pratt & Whitney Aircraft Co.

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COL. CHARLES H. DUNFIRE, commanding officer at Selfridge Field, Michigan, has been transferred to Wethersfield, Conn. He is succeeded by MAT. G. H. ERICKSON.

Representatives Named

CURTIS-WRIGHT FLYING SERVICE, Southern Illinois Airways, Decatur, Ill.

DANTE-AIRWAYS Sales Corp., Chicago, for northern Illinois, Wayne Aviation, Inc., 220 W. Grandview St., Springfield, Ill., and 100 W. Madison St., Chicago.

Warrington Motor Car Co., 2605 18th St. N. W., Washington, D. C., for the District of Columbia, Maryland, Virginia, and North Carolina.

Deasey-Owens—Air Transport Sales Co., Inc., Toledo, Ohio.

FAIRCHILD AIR CHAMBER—Richard Scott, Waukegan, Ill., Mr. George E. Elft, Freeport, Henderson, Hill, and Marion counties.

PRATT & WHITNEY—Art Associates, Inc., Rosedale Field, N. Y., and northern states.

WRIGHT ENTERPRISES—Thompson Aerocastrol Corp., Cleveland, has appointed as service and parts dealers Wright and Kenning, Buffalo, N. Y.; Blue Aviation, Greenglass, Pa.; Commonwealth Flying Service, Pittsburgh, Pa.

FAIRCHILD—Art Services, Inc., Akron, Ohio, for Ohio.

GEORGE LAKES—McGraw Flying Serv-

AERONAUTICAL CALENDAR

Mar 23-25 All-England Air Show, starting from Spekefield Airport, Spekefield, Merseyside, Eng.

April 21 Annual E.I.T. Display, Boston, Mass.

July 28-30 3rd International Light Photo Press and Camera Show, Berlin, Germany.

Aug. 25-Sept. 1 National Air Show, Chicago, Ill.

EXPOSITIONS

April 8-12 All-American Motor Home, Detroit.

April 19-24 The National, Detroit, Michigan, featuring the 1958 Michigan State Fair, Michigan.

April 29-May 1 Airplane and Space Equipment, London, Ontario, Canada.

May 5-10 New York Aircraft Sales, American Flying Club, 1000 Madison Ave., New York, featuring the 1958 New York International Air Show.

June 18-20 E. Phillips' Coast-to-Coast, Los Angeles, Calif., Los Angeles, Calif.

July 4 International Transportation Exposition, New Orleans, La.

Sept. 4-6 National Auto Exhibition, New York, featuring the 1958 New York International Auto Show.

MEETINGS AND CONFERENCES

April 8-10 E.I.T. Association Meeting, Detroit.

May 3 A.F.A. 6th anniversary as economic arm of aircraft manufacturers, New York, featuring the 1958 New York International Auto Show.

May 10 National Conference of Financial Institutions, Accounting Officers Association, Buffalo, N. Y.

May 21-22 French American Specialized Aircraft Show, Chateaudun, France.

June 2-4 Motor Show, Indianapolis, Indiana, featuring the 1958 Indiana State Fair.

July 4-6 Winter Intercollegiate Competition, Madison, Wis.

Sept. 8-10 E.P.D. International Air Congress, featuring the 1958 World Air Games, The Hague, Holland.

AIRPORTS OBSERVATIONS

April 8-9 Deep Air, Detroit.

April 11-13 Curtis-Wright Aerostar, Dallas, Tex.

April 13-16 Show on Ohio City, Ohio.

April 14-15 New Bedford Flying Agency, New Bedford, Mass., and Woods Hole, Mass.

April 18-21 Columbus, Ohio, Municipal Airport.

May 2 Thomas Fortune-McKinley, Miami, Fla.

May 8-10 Oklahoma City, Okla., Municipal Airport.

May 14 Duluth, Minn., Municipal Airport.

May 15 Spokane, Wash., Municipal Airport.

June 1-3 Erie County Airport, Erie, Pa., for regional transportation.

June 8-10 Akron-Canton, Akron, Ohio, Municipal Airport.

June 15-17 Memphis, Tenn., Municipal Airport.

June 22-24 St. Louis, Mo., Municipal Airport.

AIRPORTS AND AIRLINES



Airway Improvement Through West Discussed

SALT LAKE CITY (UPI)—Official delegates from nine western states attended a meeting here yesterday of the Western States Airports Association here March 25. Improvement and development of the western airways was the chief subject of discussion by the 120 government officials of public works from the chambers of the association, presided.

A spirited discussion followed the address of Edward H. Sharpe, of New York, director of public relations for The American Legion. Sharpe declared that the crop dusting need must be met and the storage areas. There are 14,000 sq. miles of federal storage now, he said, but he believed this should be greatly expanded. The discussion also turned to the question as to whether or not the time is ripe for state aid to airports.

Other questions which were considered were property rights, both on the airports and in the air, the creation of a new department of local, state, and federal governments, its relationship to the government, its application to the granting of certificates of convenience and necessity and the co-operation of local and federal agencies in the promotion of the airports.

Alabama Court Holds City Liable in Port Case

MONTGOMERY (UPI)—The Supreme Court of Alabama has confirmed the decision of lower courts that a magazine operating as an airport is liable for damage resulting from negligence.

In a 5-4 decision, the court upheld a judgment of the state court of common pleas of Montgomery county.

The decision was rendered in the suit of William A. Lester v. City of Mobile and John R. Prevey, city engineer, for damage to a road leading to the Lester airport, which operated as a private company owned by the owner.

The court held that an airport is necessarily a part of the city's transportation facilities, rather than a public park or recreation area.

It ruled that the Lester field, in conjunction with which it has been ruled that a city is acting as a corporation instead of a public utility.

The court found on parsimony that the Lester field was a private company owned by the owner.

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Picksick Lowers Rates

LOS ANGELES (UPI)—Lower one-way and round-trip excursion rates have been announced by Pickwick Airlines over the Los Angeles-Monrovia-Naples route, effective at once, and fares from \$22.25 to \$26 and the round-trip fare from \$48.50 to \$52.50. The Los Angeles-Toronto round-trip fare is \$49.50 to \$54.50, the round-trip fare from \$38 to \$42.50 to \$47.50. Lower economy rates through San Jose to San Francisco are also to be placed in effect at once, according to L. S. Reid, general traffic manager.

N.A.T. and United Merger in Prospect

More Involves Plus For Passenger Services

WASHINGTON (UPI)—National Air Transport, of which the author is president, is ready to merge into the passenger business of Pan American World Airways, Inc., in a large scale about August 1. This is on the basis of this airline announcement comes the report that there is to be a merger between the interests of N.A.T. and the United Airlines & Transport Corp. Such a move, which is reported to be hanging on meetings soon of the boards of directors of the two companies, would be of major importance in the evolution of air transport.

The proposed combination will bring into being the first all-air transoceanic service, matching Pan American's inauguration of a San Francisco-Panama passenger service this spring and N.A.T.'s own transoceanic passenger service. The introduction of passenger planes between New York and Chicago this summer is to be followed later in September by flights between New York and London, and beginning in October by flights between New York and Paris.

There has been a close working agreement with the Pan American System, which includes a financial interest, making it possible for the two largest transoceanic routes to be the Americas system. N.A.T. assesses that on day flights passengers and mail will be carried together. No passenger flying is contemplated on night flights, however. Route network will be New York, Cincinnati, Toledo, Chicago, Cleveland, Detroit, St. Joseph, Kansas City, Wichita, Tulsa, Oklahoma City, Fort Worth, Dallas, Corpus Christi, Galveston, Houston, Brownsville, Rio Grande City, El Paso, Lubbock, Amarillo, Odessa, and San Antonio.

Passenger schedules for Pan American's new flights will be identical with those of Pan American's flights between New York and London, Paris, Rome, and South America.

Non-Scheduled Flights

Plane schedules to leave New York at 1:30 p.m. and arrive at Chicago at 6:30 p.m. (flight time, 6 hr.), the return trip starting at 10:30 p.m. and arriving at 6:30 a.m. The Chicago-Dallas schedule places planes to leave Chicago at 8:30 a.m. arriving at Dallas at 9:30 a.m. and leaving Dallas at 8:30 p.m. arriving at Chicago at 10:30 p.m. The return trip starts at 10:30 p.m. and arrives at Dallas at 11:30 p.m. Round-trip fares are \$100. Passengers will be charged \$10 extra for checked luggage. The non-scheduled flights are planned for the San Louis-St. Louis division, leaving each city at 8 a.m., 10 a.m., and 12 noon. Round-trip fares are to be \$100.

(Continued on p. 180)

■ ■ ■ AIRPORT CONSTRUCTION PROJECTS ■ ■ ■

Continued

Passenger terminal work has been started at the St. Louis (III) Airport. The field is L-shaped with an runway. Negotiations are under way to acquire 80 additional acres for a rectangular field.

The B. Russell Corp. of St. Louis is preparing the site and building for Van Houten Aircraft Corp. of St. Louis, adjacent to the 100-acre field being recently completed for the company at the St. Louis Municipal Airport.

Improvements at the St. Louis Municipal Airport are also under way and include a concrete turn strip connecting the north end of the apron with a east-west runway, which terminates at the northwest corner of the field.

The Curtis-Wright Flying Service is reported to have invested \$300,000 in developing its base at the Fariss Airport, Kansas City, Kan., during its first year of operation just ended.

On March 24, Council Bluffs, Iowa, accepted plans of bids for a complete runway, taxiway, lighting and drainage modification of its new \$800,000 municipal airport.

The 100-acre Dixie (III) Airport is under construction and will be dedicated in the next several weeks. The airframe, engines, instruments and a hangar are being built. The field is a gift to the city by Charles Wileman, the chain drug store operator.

Laramie, Wyo., has received bids on the construction of a water tower at the municipal airport. The system will include a pump house costing about \$2,200, a water main costing about \$550 and a pressure pump system costing about \$2,500.

Winnick, Ohio, has voted to approve \$20,000 more for an immediate field.

End

Construction of the first of several concrete ramps has been authorized by the Great E. Martin Co. for the Army at the 100-acre field at Fort Belvoir, Va. The ramp will be 140 ft long and 40 ft wide and will be 10 ft above ground level. The grade will be 7 per cent, and the depth of water at the outer end, 1 ft. A concrete road 20 ft wide will be built from the head of the ramp to the roadway near the end of the 1,200 ft road. The approach is being installed to permit launching of the flying boats now under construction for the Navy.

Two new brick two-story barracks, located on 200 acres, have been approved for occupancy at Milner Field, Ia. The buildings are to be used soon for the construction of buildings for married non-commissioned officers and for all enlisted personnel now quartered at Milner Field.

An arrangement known as "Sky Shop," consisting of 200 stores with savings ranging from 2,000 to 3,000 ft, has been developed at Sarasota, Fla., and a small branch has been opened.

Construction of the facilities and equipment at the Franklin (Pa.) Airport is planned for the early spring

and summer. This building will be leased to the government at \$1 a year by the aviation committee of the Atlanta City Council.

A steel frame hangar has been completed at the Hopkinsville (Ky.) Municipal Airport, which cost \$150,000. The interior dimensions are 220' x 300' and \$30,000 is being spent on improvements. Light are to be installed.

Complete Construction At Abilene, Tex., Airport

ABILENE (Tex.)—Construction of a new \$100,000 administration building will be completed at the municipal airport here, and the landing field is now ready for normal flight operations, accompanied by an air service, with take place May 31. The field was originally owned by the Abilene Coal Under the supervision of the Abilene Coal Company, the expansion of the Abilene Coal System includes a 300,000 sq ft revolving beacon, green approach lights at the end of runways, white boundary lights, floodlighting for night landing, and a control tower. The aid is ready, and runways have been treated with oil and asphalt.

The administration is a two-story structure. The ground floor contains the office of the manager, a telephone office and rent room. The second story is the field manager's apartment. A steel and brick hangar 80 x 120 ft has been constructed. Like the administration building, it is built entirely with wings. Adjacent to it is a lounge containing heating plant, offices shop and transformer room. The airport also has a gasoline and fueling station, and planes are being stored for a hard.

Radio License Granted

WASHINGTON (D. C.)—Aeronautics has been issued by the Federal Radio Commission a radio license for the new airport associated with American Airways, Inc., known as the airport of the new Memphis Patch (See). The new Airport has been bought, and bonds totaling \$500,000 have been sold to finance construction of the field and hangars. The field is now being developed by Thomas Phillips, Memphis, Tenn.

A new hangar is being built at Evans Field of the Northwest Airlines Corporation, Inc., Seattle, for the use of Elwood G. Campbell, president. Services will be provided there for the year at Whittier, Peterborough, and Jensen, Alaska.

Work on runways and hangars in the upper portion of the former Pueblo Air Park, reported to be 700-acre runways have been graded and are being surfaced with flat crushed rock. Another runway measuring 1,200 ft is in length and is under construction at a cost of \$14,000.

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Central and Braniff Operations Changed

FORT WORTH (Tex.)—Operation of Braniff International Airways, Inc., has been taken over by Southern Division of American Airlines, Inc., subsidiary of the American Corp. Headquarters will be maintained here, and the Southern Division has been placed in charge of all flights which have been in charge of Southern Air Transport. The latter name will no longer be used, as reported when American Airways was acquired in February.

Certain routes will remain operating under the Southern Division, and others will undergo changes. The most important change is discontinuance of service to Wichita, Kan., on the Kansas City-Tulsa-Dallas line. This makes available a direct route from Cleveland to La. Crossfield, via the following schedule: La. Crossfield, 8:55 a.m. (Universal Division); La. St. Louis, 1:25 p.m.; La. Tulsa, 2:50 p.m. (Southern Div.). The Southern Division will also discontinue its service to the St. Louis-Kansas City line, furnish another connection with Southern Division at Kansas City. In addition, Southern Division operates a shuttle service between Tulsa and Oklahoma City.

W.A.E. Gets Group Insurance

LOS ANGELES (Calif.)—Aeronautics has been made by officers of Western Air Express, Inc., of members of a group insurance plan covering all employees of the company, including pilots and co-pilots. The insurance was written by spatial arrangement with the Connecticut General Life Insurance Co. From the beginning, the company has had a policy of giving all employees a copy of all operating policies and records of Western Air Express. The official record revealed that Western Air Express planes have flown a total of 4,000,000 hr without a passenger being injured. The company has a strict pre-employment check, employees whether an executive, office worker, or pilot, receiving a stated amount in the event of death or total disability.

The insurance plan is to be in existence in any other state, and it is anticipated that Western Air Express is to receive more than half of the premium. The company will have to pay more than half.

Farmers Buy Southern Field

AMERICUS (Ga.)—Farmers Aircraft Corp., the American subsidiary of the German "Braniff" airline, has acquired 1,000 acres of land from the Sumter County Board of Commissioners. Through holding interests holding the firm in this country, it is learned Farmers Aircraft plans to build a regional airport at a Farmers-owned farm, about five miles from Americus. Harry Parsons is president of the Farmers Aircraft Corp.

Fix Rate for Graf Zeppelin Mail
WASHINGTON (D. C.)—Transatlantic mail via Graf Zeppelin was discontinued at a recent conference held by Dr. Eckener and Postmaster-General Briscoe. The Postmaster-General said that his department would co-operate in this regard, and that the development of mail service by dirigible would be left to him in charge of Southern Air Transport.

The latter name will no longer be used, as reported when American Airways was acquired in February. Certain routes will remain operating under the Southern Division, and others will undergo changes. The most important change is discontinuance of service to Wichita, Kan., on the Kansas City-Tulsa-Dallas line. This makes available a direct route from Cleveland to La. Crossfield, via the following schedule: La. Crossfield, 8:55 a.m. (Universal Division); La. St. Louis, 1:25 p.m.; La. Tulsa, 2:50 p.m. (Southern Div.). The Southern Division will also discontinue its service to the St. Louis-Kansas City line, furnish another connection with Southern Division at Kansas City. In addition, Southern Division operates a shuttle service between Tulsa and Oklahoma City.

Hearing Is Held On D. C. Port Plan

WASHINGTON (D. C.)—A favorable report on the Hughes bill to establish a third airport in the District will be made available later this month. The bill, introduced by Rep. John C. Costigan, D-Ill., is believed, by the subcommittee which has had the bill under consideration, although a majority of the committee voted against the plan to locate it in Washington. March 26, proposed field would be made up of the present Dulles Field and Washington Airport, in combination with part of the new proposed Dulles Airport. The bill, introduced by Rep. John C. Costigan, D-Ill., and passed to the Senate incorporating the plan from the standard. A sum of \$2,300,000, without interest, would be made by the federal government to the District for the development of the field, which would be held by the federal government. The existing fields have agreed to sell their holdings for cost (to be ascertained from their books) plus 10 per cent.

N.A.T.-United Merger

(Continued from page 245)
Illustrated at Badley Field, Chicago, April 3, 1959. Left, Dr. J. H. Dillinger, chief of radio research; middle, Bill H. Dillinger, director of aerospace development; Gilham G. Brubaker, director of air regulation; Frederick R. Stahl, chief of the aerospace information division, is secretary of the committee.

Other members of the committee are as follows: F. C. Hirschberg, chief engineer, airways division; Dr. J. H. Dillinger, chief of radio research; Bill H. Dillinger, director of aerospace development; Gilham G. Brubaker, director of air regulation; Frederick R. Stahl, chief of the aerospace information division, is secretary of the committee.

Plan to Extend Radio Telephone Experiments

WASHINGTON (D. C.)—Plans are now being made by the Aerospace Research Center for experiments with ground-to-plane and plane-to-ground radio telephone communication on the New York-Cleveland-Baltimore route. Estimated distance of about 300 miles at 300 ft altitude is 200 miles at night, and 250 miles at day. The experiments, which have been in progress since last fall, have already been made on the Chicago-Cleveland route. For this purpose, experimental stations have been established at Badley Field, New Brunswick, N. J., and Bellvue, Pa.

One of the purposes of the experiments is to determine the feasibility of using the aircraft as a mobile communications center for radio telephone broadcasting from airplane to flight. Ground stations will be located at airports in the neighborhood of 300 miles apart at Maryland, Woodland, St. Louis, and 344 miles from Cleveland, plus 200 miles west of Milwaukee, 300 miles from Chicago, and 344 miles from Cleveland. If the experiments are successful it is anticipated that a regular service of plane position reporting will be tried.

Aeronautics Branch Forms Radio Committee

WASHINGTON (D. C.)—To determine and define the policies of the Aeronautics Branch on the subject of radio, an executive committee on aerospace radio has been formed under the chairmanship of Chairman M. Young, assistant director of the communications division. The committee will also consider and modify the requirements of the Air Commerce Regulations pertaining to radio equipment for aircraft and airport or intermediate stations.

Other members of the committee are as follows: F. C. Hirschberg, chief engineer, airways division; Dr. J. H. Dillinger, chief of radio research; Bill H. Dillinger, director of aerospace development; Gilham G. Brubaker, director of air regulation; Frederick R. Stahl, chief of the aerospace information division, is secretary of the committee.

To Out Airport Objectors

NEW ORLEANS (La.)—Without a dissenting vote the Miss. Delta, Levee Board has voted to invoke eminent domain to condemn 200 camp owners, whose campsite is on the delta in areas of such value to the health of the Mississippi River that they have been declared to be of great social and economic value to the state. The campers have been told to leave their sites by June 1, or face removal through the courts. The Levee Board has been given power to remove them by force if necessary. Action of the board followed efforts by the camp owners, who had filed suit in the 5th district court to enjoin the Levee Board, to cause damage to fight the airport project because of its conflict with their interests.

E.A.T. Operations Changed to Speed Service

NEW YORK (AP)—A number of changes have been made in the Eastern Air Transport Miami-New York service by Eastern Air Transport coincident with the change in schedule April 1. The main plane now flies the New York-Miami route via the Western air mail belt with the rest of the route. It has been placed upon the nonstop segment calendar. Pending the disposition of the Watusi belt, the Pan American Airways and Eastern Air Transport without change at Jacksonville and Miami, a place it flies through from Atlanta to Miami without the previous change in Jacksonville. Plans are being considered here to make the latter a point of origin for one another's transatlantic flights.

Bethpage Newark Metropolitan Airport will be the northern base for the new east-west service. The change planned for some time to be undertaken when conditions warranted was initiated by the recent fire at Haledon Field, which burns Eastern Air Transport planes whenever they land. U.S. Senator George Meany has suggested creation of a committee to investigate the proposal to establish an airport or marshfield at Haledon, Bergen, N. J.

Western Canada Airways, operating the Prairie Air Mail, is using its Fokker F.VIIAs and three Fokker 50s and one Fokker 50B to do its job.

Passenger fares on the Wright-Wilkins New Orleans-St. Louis-Baltimore-Shreveport (La.) line were reduced 25 per cent effective March 15, making the fare from New Orleans to Shreveport \$22.50.

S. Tait has taken a two-year leave from the Canadian Legion airport at McLean, N. S.

Standard Shipping Corporation
(Standard Steel Corp.)
New York-Airline

	East Bound	West Bound
New York	Am	Am
Philadelphia	Am	Am
Baltimore	Am	Am
Washington	Am	Am
St. Louis	Am	Am
Memphis	Am	Am
Birmingham	Am	Am
Houston	Am	Am
Dallas	Am	Am
San Antonio	Am	Am
Los Angeles	Am	Am
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San Francisco	Am	Am

All flights to the Midwest and Far West now start with a stop at Chicago, while flights to the East Coast start at New York. On the return trip, flights to the Midwest and Far West start with stops at Atlanta, Dallas, Denver and Chicago. All flights to the Northeast start with stops at Atlanta, Dallas, Denver and Chicago. All flights to the Midwest and Far West start with stops at Atlanta, Dallas, Denver and Chicago. All flights to the Northeast start with stops at Atlanta, Dallas, Denver and Chicago.

Delta—St. Petersburg, Florida

For the fifth consecutive month, Delta Air Lines has maintained a 100 per cent punctuality record. The airline has also maintained a 100 per cent safety record.

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Domestic International Airlines
Rutherford, New Jersey

Delta—St. Petersburg, Florida

Operating a New York with three international services to the Midwest, East and West Coast, Delta Air Lines has maintained a 100 per cent punctuality record for the fifth consecutive month.

AVIATION April 1, 1948

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Announces Program Of French Air Events

PARIS (REUTERS)—The Sporting Committee of the Aero Club of France has announced a calendar of sporting events for this season as follows:

May 1—Start of second competition for the Soultz Charleroi trophy, starting Sept. 30. This event is open to the 100 best aviators in the world categories; the prize going to the pilot covering a 1,600-km. tour of France with no compulsory landing over a predetermined route in the shortest time. The tour was won last year by Captain Gobert of a Coupe Dassault at a speed of 112 miles.

May 29-June 1—Starman contest for touring planes under auspices of Aero Club of Herstal and Averoy.

July 1—Exhibition of seaplane base at Noisy.

June 1—Dedication of airplane base at St. Etienne-les-Bains.

June 6-8—Annual national air meet at Vichy.

June 26—Start of second contest for Michelin trophy. This also is a speed event over a 1,250-km. route through Picardy, with fifteen compulsory stops. It is limited to planes with engines of 200 h.p. or more. The first prize was won by M. Dartrey on a Morane-Saulnier 130 monoplane, fitted with a 230 h.p. Hispano, at 148.2 miles.

July 20—Start of second competition for the Rennet trophy. This is awarded for the best non-stop distance flight in the competition period.

Plewick Busy in Mexico

MEXICO CITY (REUTERS)—American and Canadian streams of Plewick-Latins American Airways from the date of their return to Mexico City on Dec. 20, 1937, passengers and 250 h.p. of mail. During this period the planes on these services flew 353,500 miles. In January 275 passengers traveled over these lines—so far as can be learned over 100,000 miles of 250 h.p. mail were carried. On the Mexican and Canadian divisions twelve planes are employed. All are American.

Plan International Glider Group

HERLICH (REUTERS)—As a result of the first international congress for sailplane flying, which was held in Berlin on March 12, the representatives of all the countries interested have decided to combine their activities and form a body under the name of "International Commission for Gliding in Mountain Flight."

Plan Air Mail Stamp Exhibit

PARIS (REUTERS)—An International Air Mail Stamp exhibition will be held in Paris, May 6-15. A special official stamp will be issued during the show only and will be sold to visitors in francs and centimes. Stamps for the exhibition are received until June 30 by the Aero Club of France, this city.

Private Air Yacht Built by Supermarine



This semi-experimental flying boat has been built for the private use of A. E. Gammie, who has done considerable travelling by air in other machines but has owned. A description of this plane was printed in the March 15 issue of Aviation. It was built by Supermarine Aviation Works, Ltd.

Foreign Briefs

Race for Flying Instruction by Phillips and Powis, Reading, England. This has been reduced to slightly less than \$18 per hour, with a scale of vouchers for courses, with higher selling at \$18 per hour.

The reduced charges are entrance fee or regular tuition.

A Hafnia the new port being developed in Indonesia 200 miles of land have been purchased for use as an airport.

The first flying school of 1938 was held at Hafnia, with 100 students, and with about 60 planes participating. Last October Club also already held an optional meet just finished, with one German glider and one built from an American model, both of the primary training type.

Two valuable services for gliding have been formed in dirigibles—one near Zweibruecken, on the main, and the other at Kasselberg, near Louvain. Herr Hirsh, the German expert recently made a flight of 1 hr. 10 min. in the latter location, on a Kassel and glider.

The airline died at Karatsu, India, was completed March 9, and is ready for use by dirigible, if and when preparing flights for the Orient.

Lord Coates, who is associated with the British Southern Co., is said to have performed as airplane Diesel engine.

There are at present 160 glider clubs in Germany, 220 gliders in use, a flying school with 2000 class C pilots, the last classification being fully qualified for soaring.

There are now 78 landing fields in French Indo-China, of which 23 have hangars.

A British seaplane with four 250 h.p. engines has successfully completed a trans-oceanic crossing, intended to carry two passengers and a crew of three, but recently been flight tested.

Douai has installed a silver medal with the Belgian government for manufacturing a light four-blade propeller to an Lioré et Olivier for a light plane flight from Sainte-Marguerite via Tripoli

and Kristen, in northeast Africa.

The airline from Crotia to Palauvia Kinau and Nagale will be operated daily this summer, and the Ryne-Geneva-Berlin and Bonn-Bremen-Aachen-Cologne-Munich lines will be operated twice weekly.

A weather broadcasting station is being erected at Negropont, Corfu.

Regular night and service between Brussels and London was to be inaugurated March 15 at 5 p.m.

A soaring meet for the Graf Zeppelin is to be erected near Herrenberg, Baden, but has not yet been given a date.

Greece's East Hellen has announced against an increase in the tariff on gasoline.

Italy orders for Moth planes have been received by Avions Morane-Saulnier, recently renamed as the Heinkel-Henschel-Werke, France. The first order was from Capo Caccia.

Mrs. Luisa Bernasconi, holder of the woman's distance record, plans to fly to Japan in a Fairey 100 cabin plane.

Experiments with delivery of air parcels paid by parachute are to be made in April.

Air racing will be held Saturday, April 8, at Reading, England, and it is planned to have races at one or another airport every Saturday during the summer.

At Marlow Sir Edward Ellington, K.C.B., G.C.V.O., T.R.E., has been appointed Governor Air Advisor-on-Court to the King of England.

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Off Like a Bird— Swiftly and Smoothly— from a COLAS Runway

As smooth as your smoothest
airplane surfaces.
COLAS.



Photograph of airplane equipped with COLAS Runways



A smooth
runway
for
smooth
flights.



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5/8-inch Refacer

\$148

MORE THAN JUST — A REFACER —

Read what the Chief Mechanic of one of the largest airports in the East has to say about the Black & Decker Refacer

"In personal reasons to certainly I have found no 14-inch Black & Decker Electric Valve Refacer to be the most useful item in our shop. Before metal becomes too hard for its original purpose it is at a great saving of time and costly labor in making the following items:

Several types pins and bolts, special studs, special bushings, special knobs for pistol mounted hand-grinding attachment which makes grinding down casting for bolting, such as is used in plane engine cases, and grinding down wood airplane pylons can also be made.

All the valve refacers provided with the Black & Decker Valve Refacer are a few grinding wheels of different grades—which can be changed to different shapes, locations, etc., are very good unless short and a lot of pressure seems to be used by the operator." ■

BESIDES ACCURATELY REFACING VALVES, THIS MACHINE TAKES CARE OF THE FOLLOWING:

SQUARING OFF ENDS OF VALVE STEMS.
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SHARPENING VALVE SEAT BEAMERS.

By sharpening beamers on the same machine which grinds the valves you insure identical angles on both valve seat and valve.

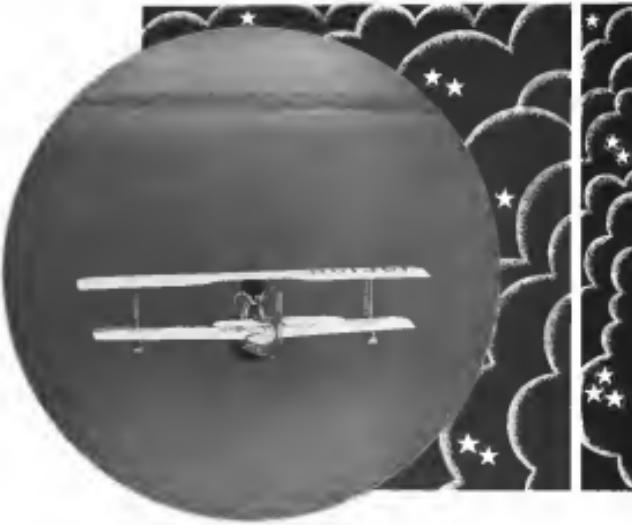
GRINDING BREAKER POINTS.
The breaker point grinding attachment is a very ingenious arrangement, enabling the

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SPECIAL JOBS requiring precision grinding, with or without angle cut, such as dies, fittings, etc.



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With the Pistol Grip and Trigger Switch"



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For safety on the water and performance in the air, a flying boat must be first "boat", secondly in every respect. It must possess all those qualities which experienced yachtsmen demand, and should be designed by a naval architect. The flying ability of the boat is then the responsibility of an aeronautical engineer.

The stability, speediness, and easy maneuverability of the Viking, both on the water and in the air, are the achievements of Louis Schreder, who was first a yacht designer, then an aeronautical engineer working with naval architects.

Modest in size, unequalled by others in the same price range, the Viking is the result of fifteen years effort to perfect a flying boat equally at home on the water and in the air — seaworthy — airworthy. The Viking is built in America and powered with a 295 h. p. Wright J-6 engine.

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89 Berlin Avenue, New Haven, Conn.
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Cornered!... the elusive match

SPALDING announces that Spalding Samson Flying Suits now have a special ergonomic pocket on the left leg—a cool little pocket—just there especially to hold your matches and cigarettes.

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Then you'll appreciate the convenience of having matches and cigarettes always ready to hand in this trim little pocket.

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24 Transmitter

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Hazards are reduced to a minimum in planes using Skelly products. Pilots know this by experience. And mechanics know a plane sent out thus serviced, will return sane the worse for wear, no matter how long or hard the flight.



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Someone May Have
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"There's a lot more flying left in that oil it's Quaker State!"

LONG, long after the ordinary oil reaches the shot-to-pieces point, Quaker State Aero Oil holds its tough, oily body—and keeps right on giving your motor that sweater, silkier lubrication.

Quaker State lasts and lives longer because there's an extra quart of *lubricants* in every gallon of it—a whole quart more of friction-fightin' lubrication than you get in the gallon of ordinary oil. The reason? Because of the way Quaker State Aero is made, the way it is refined.

Ordinary refining leaves in every gallon of oil, one quart or more that is of little or no value as a lubricant to your motor—it is little more than a quart of waste as far as lubrication is concerned.

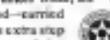
But you don't get this waste in Quaker State, for Quaker State Aero Oil is super-refined—carried a step further than ordinary oils. This extra step removes the quart of waste that ordinary refining

leaves in. In its place you get a quart of the finest lubricant—a quart more than you get in the gallon of ordinary oil—you actually get an *extra* quart in every gallon of Quaker State!

And—simply important—every single gallon of Quaker State Aero Oil is made from 100% pure Pennsylvania Grade Crude Oil. There's no better—it's the finest the world produces!

Ask for Quaker State at your airport—and you'll get the greatest lubrication you ever found for your motor, anywhere. It's remarkable how it relieves in heat! It will stand heat that would cripple an ordinary oil—it's the greatest aero oil that ever kept a motor out of trouble! Try it!

There is no finer Quaker State Program money flying around at 30 miles P. S. T.—start to cover Greater North.



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The country one which the "Tucán" flies nonstop (approximately) between Rio Branco, eastern Amazonas, and Umanzinho, and between Manaus and Belém, is the Democratic Republic of Brazil. "Gordito"



New "S-37" altitude纪录 a record set by Create Petroleum Corporation. Standardized the Company's CP-111 for transoceanic flights. The S-37 is equally important in the short distance use in the States. Many cities where present fields are miles from business centers have suitable water landing facilities close at hand.



New world's response records for altitude with load and speed with load were recently established with a Sikorsky.

"Gordito," the Sikorsky Amphibion of the Create Petroleum Corporation, is particularly well suited to the exacting duties assigned to him. His hundred miles of nonstop, plus and minus regular Manaus and Manacapuru, Manaus-Belém between these important cities, enabled the Create to reduce travel time from six to six days. In the Sikorsky Amphibion the time is cut to six hours.

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Sikorsky Amphibions are proving themselves excellent investments in the service of business and industrial firms, transport lines and individuals. No folder recently issued there are some rather interesting facts concerning the unusual advantages of the "S-37." May we send you a copy?



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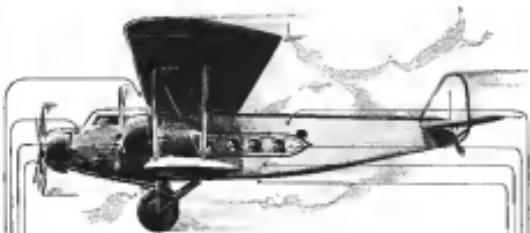
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BY every test 'TP' Aero Motor Lubricating Oil plainly demonstrates its superiority. It represents a great stride ahead in the science of lubrication. 'TP' eliminates many causes of engine trouble—reduces the risk of flying.

'TP' Aero Motor Lubricating Oils are now—the latest development—in specific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are mineral oils, not blended or compounded produced from pure paraffin-base crude by a process for which patents are pending.

This process has marked ad-

vantages over other methods. It removes all the paraffin wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plug, easy cold starting, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitude—a maximum of safe flying hours.

A handsome, practical Pilot's Log Book sent free on request.

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TP AERO MOTOR LUBRICATING OIL

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(This advertisement is one of a series showing Thompson Valves from some of the historic auto motors that used them in setting new world's endurance records.)

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Only valves of extreme accuracy and stamina could stand up under punishment like this! More than a week of rapid opening and closing — of cherry-red heat — of constant pounding on the valve seats!

Yet, after the 174-hour flight of the "City of Cleveland" in July, 1929, the Thompson Valves that helped set this record showed no evidence of deterioration. The untouched photograph reproduced on this page shows two of them soon after the flight. Their condition is typical of the 18 Thompson Valves that flew with the "City of Cleveland."

Performance such as this in every test has influenced aero engineers to specify Thompson Valves. Today, Thompson Valves are used in 95% of all American aero engines.

THOMPSON PRODUCTS, INCORPORATED
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Factories: CLEVELAND and DETROIT



**Thompson
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Two Thompson Valves that helped make history. An exhaust valve and an intake valve taken from the "City of Cleveland" immediately after its famous flight.



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PILOTS everywhere who enjoy the convenience and safety of electric starting find Exide Aircraft Batteries absolutely dependable for that job and many others.

These batteries can be relied upon to jump to their job with a surge of current or a steady, even flow, as may be required. Millions

of miles stand witness to the trouble-free, economical performance of Exides in the hundred kinds of flying service. And Exide Aircraft Batteries are specially designed so that the electrolyte will not spill . . . are built to conform to the rigid requirements set for aircraft equipment.

Not only do Exide Aircraft Batteries provide efficient, economical starting and ignition, but they also furnish dependable, steady current for landing, cabin and instrument board lights . . . navigation lights . . . radio power.

Write today. We will send the details about Exide Aircraft Batteries, the many different types and their varied applications. There's no obligation whatever.

Exide
AIRCRAFT
BATTERIES

No OTHER PART OF AN AIRPLANE IS MORE PRECISION-BUILT

THE cylinder of Aerol Milneay Struts are machined in one piece from a single chrome-nickel-steel extruded or tube-larged specially heat-treated in modern electric furnaces under pyrometer control. The possibility of flaws in the metal or errors in heat-treating are eliminated.



THE finished cylinder is exactingly machined to rigid limits. One one-thousandths of one inch is the maximum tolerance allowed, and rigid inspection prevents the passing of any cylinders not meeting these requirements.

THE piston assembly also represents the highest quality of materials and workmanship. The piston is made from a special chrome-nickel-steel extruded or tube-larged and the carefully fitted head is of slow-wearing gun metal. The special packing holds a perfect seal throughout years of active service.

THE finished strut combines fine materials, workmanship and superior design. No other type of landing shock absorber can equal the operating efficiency and long life of these struts. That is why there are more Aerol Struts in use today than any other make.



BUILT BY THE CLEVELAND PNEUMATIC TOOL CO., CLEVELAND

AEROL STRUT

shock absorbing

ARE YOU losing revenue because planes are unable to land or take off from runways in wet weather? Tarmac surfaces soon pay for themselves.

Are you losing money in parking fees because you have no surfaces on your parking areas? Tarmac surfaces soon pay for themselves.

Are you losing possible patronage because there are no adequate all-weather approach roads to your airport? Tarmac soon pays for itself there.

Surface

RUNWAYS
PARKING AREAS
HANGAR APRONS
CONNECTING ROADS
TAXI STRIPS

at moderate cost

with Taxmac

This matter of airport surfacing has to be decided with a knowledge of its effect on a field's revenues. Curtiss-Bettis Field, near Pittsburgh, laid Tarmac-surfaced runways last fall, and for the first time kept the field in constant uninterrupted operation throughout the winter . . . with air mail in and out every day and night, with 5,000 passengers handled in seven full and winter months, with many privates flies selecting the field as their base of operations.

Surfice your field with Taxmac . . . it will soon pay for itself. Write for information on Taxmac for airport paving.

AMERICAN TAR PRODUCTS COMPANY

Division of The Republic Company

GENERAL OFFICES: PITTSBURGH, PA.

Cleveland, Ohio
Milwaukee, Wis.
Topeka, Kansas

Minneapolis, Minn.
St. Paul, Minn.

Baltimore, Md.
New Haven, Conn.

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PRECISION BUILT . . .

There are 4 cardinal points of practical aircraft power. They are dependability, economy, convenience and smoothness. All result from the same basic fundamental of construction—precision. Continental has entered the aeronautical field with the unalterable purpose of building the best aircraft engines in the world. They are Precision Built. Continental is producing Practical Aircraft Power.

"Approved Type Certificate No. 33, U. S. Department of Commerce"

CONTINENTAL AIRCRAFT ENGINE CO.
General Office and Factory: Detroit, Michigan

Continental Engines



Drawing upon the facilities and experience of the greatest engine builder in the world, Continental is uniquely equipped to compete with the trade in the design and production of engines to fit individual requirements.



WHEN HOURS OR MINUTES *mean dollars to you*

EMERGENCIES develop suddenly! You may require materials for a motor repair job at once. To finish an extension on time, you need more wiring materials. Again, an unexpected decision to increase production requires additional and MADA lamps immediately. More than one department or a few individuals are concerned, for when you secure materials promptly, your entire production schedule may be affected.

In emergencies such as these... when hours or minutes mean dollars to you . . . the ample, readily available stocks of the General Electric Supply Corporation assure quick deliveries.

The General Electric Supply Corporation consists of more than 60 wholesale warehouses, strategically located throughout the United States. All communities are supplied within a few hours—and many are served in minutes. No electrical distributing net-

work anywhere can give more prompt shipping service.

Thus the General Electric Company has taken another forward step to meet the nation's far-reaching electrical requirements. The General Electric Supply Corporation, utilizing the experience of the oldest and largest electrical manufacturing organization in the world, enables you to secure supplies and materials easily when you want them. When you have an electrical need—act fast!



...to serve better the electrical needs of America

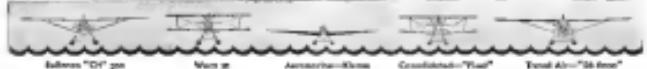
See us in the General Electric Room, broadcast every Saturday morning, over a nation-wide R. R. C. network.

GENERAL ELECTRIC
SUPPLY CORPORATION

GENERAL OFFICES

BRIDGEPORT, CONNECTICUT

EDO ALLY
OF AIRPLANE QUALITY



THERE is no reason for gambling on float equipment when proved superiority is right of hand. An overwhelming majority of the floats on all types of commercial planes are made by EDO. The standard float equipment of Western Canada Airways, who fly over half of the total Canadian road freight, is EDO. The U. S. Department of Commerce has licensed over twenty different types of seaplanes with EDO Floats—more than all other manufacturers combined. EDO Floats must be good to merit such universal choice.

Every EDD installation is the substantial total of all desirable Root Features. Check these outstanding points: Entirely of metal, a single, homogeneous unit that will not rot, shrink nor absorb water—“Added” metal sheeting, proof against corrosion—exclusive and patented fluted bottoms for rigidity and quick



sake-off—water-tight bulkheads every two feet for buoyancy in spite of severe damage—extra heavy keels to permit sliding about without crooks—heavy side sheets to eliminate complicated internal lacing—flat decks with upstanding, riveted side stems to give secure footing and permit easy removal for overhead—a shallow stem for easy toeing and bedding well up on a survey.

EDO Floats are designed and built by an organization devoted exclusively to seaplane installations. EDO engineering is backed by years of experience. Airplane manufacturers, and operators may be sure that their planes, EDO-equipped, will give perfect performance as seaplanes. Entire float installation problems can be presented to EDO with the assurance of their ready, thorough and positive solutions. EDO cooperation is cordially extended to all who have not yet availed themselves of it.



The logo for EBO THE FLOAT MAKERS. It features the letters "EBO" in a bold, sans-serif font, with a stylized graphic element resembling a fish or a float shape integrated into the letter "E". Below "EBO", the words "THE FLOAT MAKERS" are written in a smaller, all-caps, sans-serif font.

Pick Your Ship

From these Remarkable Used Plane Bargains

CURTISS-WRIGHT

1. Accepts in trade only Bureau of Aircraft and Engines.
2. Builts used equipment only when it is
assured.
3. Examines every used plane and engine
—gives you a complete and accurate
report on its condition.
4. Issues an inspection certificate with
exact rules.

Additional slightly used decommissioners of the ones manufactured by Curtis-Wright—Robin, Travel Air, Meth and others—are now on sale at various Curtis-Wright branches throughout the country. Full description and prices will be sent on request.

CURTISS-WRIGHT FLYING SERVICE

DIVISION OF CURTISS-WRIGHT CORPORATION



Ex-Cell-O Supplies Milled Thread Parts to the Leaders in the Aircraft Industry

When studs, screws, and bolts made of steel are used in conjunction with softer metal such as aluminum, there is a constant danger that threads which are die cut will re-tap the tapped hole. This danger is eliminated when threads are milled accurately.

Ex-Cell-O is equipped for the production of milled-thread parts of more than usual accuracy. It has long been Ex-Cell-O practice to pickle all material going into crankshaft and crankcase through bolts, thereby eliminating any chance of defective material getting into these highly stressed parts.

1800 OAKMAN BOULEVARD - DETROIT

Ex-Cell-O also manufactures precision wire, washers, pins, and followers, plus gaskets, sheet metal, and other products and materials. All Ex-Cell-O aircraft parts are manufactured by monolithic, screw, or riveted methods. Standard aircraft jobs will be handled upon request.

Visit Ex-Cell-O at the AD-Aerospace Aircraft Show.
Midwest Avenue
Bethel Park, Pa. 15231



THE AMPHIBION THAT GAR WOOD SELECTED

WHEN Gar Wood, amateur power boat racer and manufacturer, selected a Fokker Amphibian for his personal use, he paid a high tribute indeed to the performance of the plane, and the usefulness of its load.

Powered with a Wright 325 h. p. Cyclone or Pratt & Whitney 375 h. p. Hornet motors, Fokker Amphibians have a high speed of 112 m. p. h., and a cruising speed of 95 m. p. Rigged to fly boats, they have a high speed of 120 m. p. h. For transport or personal use, these ships are also provided with two motors.

In considering these ships, prospective purchasers will be interested to know that Fokker has built more airplanes than any other manufacturer in the world, that Fokker planes have made twice as many great pioneering flights in any other make of plane, and that Fokker planes have flown over 25,000,000 miles on transpacific runs, establishing a record for safety that has never been approached.

Because of economy due to production principles of General Motors, prices are probably less than you might expect. Terms may now be arranged on the G.M.A.C. finance plan to suit your convenience.



EX-CELL-O
Aircraft & Tool
Corporation

FOKKER
AFFILIATED WITH GENERAL MOTORS CORPORATION

R-W hangar door hardware---

50
years

R-W follows nature's design (1919-1950)
Data on "original design" and original
manufacture of aircraft door hardware
is included in the new catalog. These photos are selected parts of the
catalog or other aircraft parts in front or
at rear of article.

Preferred!



Wherever hangar doors are made and installed, R-W hardware is preferred. That's because each unit, each hidden part, is specially designed to provide smooth sliding and continued easy, trouble-free operation.

Ask your architect, your engineer, your door manufacturer. Consult an R-W engineer; consult with him from the first planning stage. Write for catalog No. F-62.

Richards-Wilcox Mfg. Co.

IN PARTNERSHIP WITH THE AIRPORTS

AIRPORTS OF AMERICA, INC.

Bengaluru, New York, Chicago, Boston, Philadelphia, Cleveland, Cincinnati, Kansas City, Atlanta, Detroit, Milwaukee, St. Louis, Denver, Salt Lake City, Los Angeles, San Francisco, Seattle, Portland, Honolulu, Honolulu, Richards-Wilcox Co., Ltd., London, Ont.

Share WACO Success



FOR THE THOUSANDS OF READERS
of this publication, there are not over
a dozen men to whom this message is
directed. To those few WACO offers
an unusual opportunity.

Finishing the year 1949 with no surplus production and with a most
favorable financial statement . . . with no encumbering alliances and with the
consequent advantage of flexibility and independence of action . . . WACO
is in an enviable position this season, and offers corresponding advantages
to the WACO distributing organization.

Likewise is the character and ability of its distributing organization,
WACO is unusually blessed. But there are still a few territories which offer
splendid opportunity for immediate and future profit, to a select few
individuals who can measure up to WACO standards, who can qualify
for the WACO franchise.

Proven business ability . . . a record of successful salesmanship . . . personal
longevity, of course . . . moderate but adequate finances . . . vision and en-
thusiasm for the possibilities in the aviation industry . . . capacity and
inclination for constant, intelligent, vigorous effort . . . these are the
essential qualifications in the men to whom this opportunity is offered.
Ability as a pilot is of secondary importance. It is desirable but can be
readily acquired.

It is significant that the distributor who took delivery on the first WACO
ever built is still numbered among the more loyal and enthusiastic WACO
representatives . . . that a distributor located in a relatively unfavorable
Eastern city disposed of fifty WACOs last year . . . that another distributor
in a Mid-West territory has steadily increased sales year after year until
he sold over a hundred WACOs . . . that the loyalty and stability of the
WACO field organization is founded upon fine policies and without fail
dealing . . . that adequate and fair dealer discounts consistently result in
manufactury net profits to WACO dealers.

If you are interested we would be pleased to discuss the matter with you
in detail.

THE WACO AIRCRAFT COMPANY, TROY, OHIO,



"ASK ANY PILOT"

And now

SAVOIA MARCHETTI



is
HEYWOOD
Equipped

START-ER
by
HEYWOOD

American Aeronautical Corporation
General Agent
Western Long Island R.C.
— 10 —

100

AMERICAN AIRCRAFT COMPANY
GENERAL AGENT

All American Aircraft have apparatus designed to fit all types of aircraft and to meet every requirement of the flying field or to make a large variety.

With numberless sets of aircraft, we can supply you with any type of aircraft equipment or any particular auxiliary equipment required.

The first time the General Service is used, it is the best guarantee to you that you will receive the best service in the commercial field of your choice.

AMERICAN AIRCRAFT CORPORATION

Frank J. Heywood



The greatest of all endorsements—endorsement by use—as again given the Heywood Starter.

Because of its consistent dependability under all climatic conditions, its instantaneous, never-failing operation, the Heywood Starter has been adopted as standard equipment by the American Aeronautical Corporation, for the Savoia Marchetti 26.

Shown above is one of the New York Police Department planes. Service to which this plane is put calls for instant and positive response to demands on the starter, and for this reason Heywood has the unqualified commendation of the pilots for this department.

Complete details on request.

SKY SPECIALTIES CORPORATION
3651 Hert Avenue • • Detroit, Michigan

speaking of *Records*..

THE "WASP" GATHERS IN SIX MORE

LEE SHOENHAIR has just established six new world's speed records for class C airplanes. He flew the "Wasp" powered Lockheed Vega monoplane "Miss Silverton," owned by the B. F. Goodrich Rubber Company. These new marks are as follows:



WITH 1000 KILOGRAMS LOAD

1. Distance of 100 kilometers at 175.991 miles per hour
2. Distance of 500 kilometers at 168.114 miles per hour
3. Distance of 1000 kilometers at 152.702 miles per hour

WITH 500 KILOGRAMS LOAD

4. Distance of 100 kilometers at 182.42 miles per hour
5. Distance of 500 kilometers at 171.280 miles per hour
6. Distance of 1000 kilometers at 152.702 miles per hour

Recognition by the Federation Aeronautique Internationale of these new records will assist the United States with 33 motor flight, heavier than air, world's records. Pratt & Whitney will hold 12 of these, or more than half of this country's heavier than air records, and three times as many as are held by any other American aeronautical engine manufacturer.

Not only in the establishment of world's records, but in the everyday carrying of mail, passengers and express, "Wasp" and "Hornet" engines are demonstrating their dependability which comes only with proven design and continuous improvement.

PRATT & WHITNEY AIRCRAFT CO.
MANUFACTURERS
Division of United Aircraft & Diesel Corporation

Manufactured in Canada by Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, P. Q.; in Continental Europe by Bavarian Motor Works, Munich; in Japan by Nakajima Aircraft Works, Toki.

Wasp & Hornet Engines



Made to the most rigid specifications to stand the gaff of training and sport

SERVE THE SMALLEST DUST LEVEL OR HIGH! Hell learn something—and the ship can stand it. Fairchild KR.

Biplanes are taking the place of training work day after day, and of sport flying too. Their unusual ability to stand the gaff is due to design, and to the use of most exacting specifications that mean a large margin of strength. All welds, for instance, are in shear and not in tension. Fuelage, landing gear and other parts are of chrome-molybdenum steel, which gives maximum strength where it is needed, yet holds the weight to the minimum. . . . Crash, often a vital factor in safety, distinguishes these ships, which have rates of 300 and 725 feet per minute. Shape that has to be wrung out of small fields and over trees and wires has no place today.

Fairchild believes that the only practicable thrill in flying is based on complete confidence in the ability of the plane to fit the use you make of it. . . . In spite of their unusual strength, these planes are light. The power of

the engine is used not to build a heavy structure, but to provide speed and climb, and carry the fuel, pilot and passengers. Fairchild KR Biplanes are competitive in price. It is the opinion of experienced pilots that they offer better values in construction, performance, maneuverability and completeness of equipment. A booklet giving full descriptions will be sent on request.



F A I R C H I L D



KR BIPLANES

FAIRCHILD AIRPLANE MANUFACTURING CORPORATION
FAIRFIELD, LONG ISLAND, NEW YORK
Plant: Farmington, N. Y.; Montreal, 26th; Longwood, P. Q., Canada
Agents & Distributors Everywhere

CHASE AIRCRAFT TRAVEL FABRICS



IN competition with newer and experimental types of upholstery and trim materials, Chase products are still leaders in the field of transportation. . . . And for this there is a reason:

The Pre-eminent Upholstery Fabric

CHASE
Vetmo

MOHAIR VELVETS

combines perfect riding-luxury with last-word stylishness such as is to be found only in De Luxe vehicles of transportation . . . including passenger airplanes.

For Trim and Upholstery

CHASE
Leatherwove
made by
SAFETY WEAVING CO.

A scientifically coated fabric—and a desirable complement to VETMO, when used as panel and door interior or an upholstery for instrument panels. A really modern fabric, giving the smooth fit service at a very moderate cost. Visit the Chase Exhibit at the Show.

These Chase Aircraft Travel Fabrics
Made by
SANFORD MILLS



L. C. CHASE & COMPANY, Selling Agents, BOSTON
NEW YORK • DETROIT • SAN FRANCISCO • CHICAGO

The message was all to one
airline or another with
GlobeAir. Air G is exclusively
available to one company.



*Convenience and
Safety Combined
in the NEW...
**Quick-Connector
IRVIN AIR CHUTE***

THE Quick-Connector type of Irvin Air Chute is worn in flight, and is neither a cushion, nor otherwise a part of an airplane chair. The chute is carried in a pack conveniently near the passenger, ready for instant use in emergencies.

All the patented safety features that have brought universal recognition to the Irvin Air Chute as the standard aerial life-saving

equipment of the world, are retained in this new Quick-Connector type Irvin. It is but one of the five different types of Irvin Air Chutes, suitable to every need, and available in all parts of the country. If you do not know any dealers, write to us for address of the nearest one.

Dealers should communicate directly with the company.

IRVIN *The Life Preserver
of the AIR*



IRVIN AIR CHUTE CO., INC., 377 PEARL STREET, BUFFALO, N.Y.
Our Master Distributor "Happy Landings" is connected with 800 distinguished operators of the Air Chutes available for immediate delivery to your local distributor.

THE STRENGTH OF THE PLANE IS IN THE TUBING

Again!

at the
All-American Aircraft Show

TUBING by SUMMERILL



will be an important
part of the Aircraft
Exhibits

In many planes featured by prominent manufacturers Summerill Tubing is used exclusively.

Huge transports and small, fast sturdy sport and mail planes are built around the quality and workmanship of Summerill Tubing.

Be sure to visit the *Summerill Tubing and Metalab* displays,
Booths 107-115.

- (a) See model draw bench in operation.
- (b) We will show you at Detroit how seamless tubes are drawn.
- (c) See why the finish of our tubes readily meet the Aircraft specifications, by the care with which they are drawn.

Summerill Tubing Company
Bridgeport (Phila. Dist.) Pa.



SRB Ball Bearings

Sustained Every Stress and Strain of the Wright-Powered Travel Air "Mystery Ship" Record Performance . . .

WHETHER for radial loads on the crankshaft, enormous thrust loads in the propeller position or for the punishment inflicted on rocker arm bearings—SRB is the overwhelming choice of the aviation engine engineer

—because SRB, size for size, gives greater load-carrying capacity and an absolutely uniform dependability.

SRB Ball Bearings lead the field in design, capacity and dependability.

STANDARD STEEL AND BEARINGS INCORPORATED
Division of American Brass Company

PACIFIC COAST DISTRIBUTORS
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Ball Bearings

ELGIN-AVIGO INSTRUMENTS



AVIGO COMPASS
\$50

Aircraft Instrument Division
ELGIN NATIONAL WATCH CO.



New York Office: 20 West 47th Street
West Coast Distributor: Pacific Altimeter Corporation
Los Angeles, California



NO DETOURS

A direct course for the pilot over land or sea is the duty of the Elgin Avigo Compass. Built to the exacting standards of three-quarters of a century of precision instrument building, this compass has met the instant approval of pilots.

The Elgin Avigo Compass meets an urgent demand for a compact, light weight, reliable compass. The head, card and compensator housing are of a new, more durable material.

The compensator is theoretically and practically correct in operation. The adjustment is positive and requires no knowledge of magnetism.

We will be pleased to furnish complete literature on the Avigo Compass or other Avigo Instruments. Just write:

For Easier, Safer Night Landings

Pyle-National Prismatic
Lens Type Landing Light



Type LANR landing light on aircraft undercarriage.

Type LANR-12 cockpit landing light. Prismatic lens directs the beam downward. Beam width is adjustable horizontally and vertically.

Pyle-National offers a complete line of landing lights, search lights, navigation instruments, indicators, control panels, and other equipment for aircraft. All products are manufactured by experienced technicians who have at their disposal the latest methods in metal, plastic, or glass construction. All products are guaranteed by the Pyle-National engineering staff.

PERFORMANCE that wins the enthusiastic approval of experienced pilots is combined with the simplest, cleanly streamlined installation in Type LANR landing lights. The clear, far-reaching beam is wide enough for full pick-up of ground detail from 700 to 1000 feet altitude. The special lens and reflector characteristics including the sharp cut-off, give a white beam without stray light. The beam is adjustable both horizontally and vertically.

Type LANR, built into the under surface of the wing, has negligible head resistance and no effect on lift or aileron control. This landing light uses the new 12 volt, 20 ampere lamp.

Write for catalog 210-B with full description



The Pyle-National Company
1334-1358 N. Kostner Avenue ~ Chicago, Ill., U.S.A.

210-B 61-17



WE REPEAT "IT'S A GOOD ENGINE!"

TWO years ago, in advertising the Challenger, we said "It's a good engine." That was when the Challenger was a mere youngster, before it had been flown hundreds of thousands of hours in actual service.

Since then, the Challenger has been in continuous production under exacting Curtiss standards. In the country's largest and finest aircraft engine factory. It has been given the backing of a dealer and service organization that is nationwide. It has been installed in hundreds of sport, commercial and training aircraft and won the affectionate regard of pilots, owners, and mechanics everywhere. It has established the World's Endurance Record with an amazing 420-hour performance.

And now it has become the 1930 Challenger, with a new U. S. Department of Commerce rating of 185 horsepower. It has attained new smoothness and quietness of operation, and new lower prices that are of keen interest to manufacturers and owners alike.

We repeat—"It's a good engine."

CURTISS AEROPLANE & MOTOR CO., Inc.
Offices: Garden City, N. Y. • Factories: Garden City, Buffalo, N. Y.
A DIVISION OF CURTISS-WRIGHT CORPORATION

ANOTHER MANUFACTURER IN THE AVIATION INDUSTRY THAT USES SKF BEARINGS

WRIGHT AERONAUTICAL CORPORATION



44 SKF BEARINGS ON WRIGHT WHIRLWIND FOR LOW COST SAFETY

FOR dependable, low cost air transportation to meet the demand of speeding up modern business, aviation motors must of necessity have a high degree of efficiency. Wright makes sure of the reliability of their 300 H. P. J-6 Whirlwind motor by using 44 SKF Bearings on the vital locations.

It can truly be said that the hour after

hour reliability... day and night... which SKF Bearings bring to Wright motors is something not based on first cost. Ultimate performance after hundreds of hours in the air is the deciding factor. Reasoning in this manner Wright finds that "the highest priced bearing in the world", is really the cheapest.

SKF INDUSTRIES, INC., 10 East 34th Street, New York, N. Y.

EQUIPPED WITH THE HIGHEST PRICED BEARING IN THE WORLD

Means just this

SKF
Ball and Roller Bearings

That the manufacturers whose product is discussed above prefer to pay more for their bearings and less for overhauling or replacing them. They prefer to pay higher prices at the beginning than maximize the higher price on the end. And, finally, they prefer to minimize by using SKF lower prices because they are made to do their job, not to fit a price list.

Those are Elastite "sandwich" joints!



Shock-absorbers, built right into the concrete! Pioneer Carey "sandwich" joints—asphalt and fiber blends, between sheets of asphalt-saturated felt. They protect the concrete, perfectly and permanently, against expansion and contraction stresses and strains.

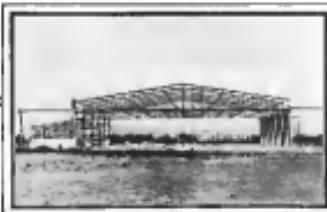
Airport properties everywhere are being given the lasting protection of Carey Elastite Expansion Joint. For runways and warming-up aprons, for taxi ways, sidewalks and hangar floors—to keep the concrete safely smooth. Write for particulars on Expansion Joint installation.

For Aviation Field Service:

Certified Asbestos Roofing and Siding, Carey Asbestos and Mesomica Heat Insulations, Carey Asbestos and Asphalt Building Roofing, Carey Elastite Asbestos Plastering, Carey Elastite Asphalt Water-proofer.

THE PHILIP CAREY COMPANY • Lockland, CINCINNATI, OHIO

Philip **Carey**
Products



AVIATION
April 5, 1939

Advertisement for the Pan-American Airshow at Miami in favor of construction. Robertson engineers assisted in its creation.

A CONSULTING SERVICE IN HANGAR CONSTRUCTION . . .

Robertson does have the experience . . . and aviation needs every ounce of it . . . and the world needs aviation. So there is a certain feeling of responsibility in possessing one of the world's greatest funds of experience in hangar construction. It has to be regarded as a public trust. There is no room for ordinary commercial attitudes in it.

Therefore, the Robertson Company SHARES its experience. You can call upon Robertson engineers for any information you may need about hangar designs, about the proper materials to use, about costs, about lighting arrangements, and ventilation, and doors, and a hundred other aspects of the situation.

This information is open to anyone who is genuinely interested in construction of hangars. Just write what your problem is. There will be no charge for recommendations and no obligation to you.

H. H. ROBERTSON COMPANY
PITTSBURGH, PA.

ROBERTSON
has the Experience
... and SHARES it



Same hangar as above, after completion.

ROBERTSON
WORLD
WIDE
HANGAR
BUILDING
EXPERIENCE



AVIATION
April 5, 1939

PROTECTION

In the earliest days of man's existence one thought was



UDYLITE is the electrolytic application
of corrosion to base metal for pro-
tection against rust.

Udylite
RUST PROOFS
MAY 1939

UDYLITE PROCESS COMPANY

Sales Office:
20 East 45th St.
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605 Jefferson Ave.
DETROIT,
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Sales Office:
1045 Sansome St.
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constantly uppermost in his
mind—to protect himself—to
protect his belongings.

Today manufacturing concerns
must protect their products
against the ravages of rust
and corrosion.

UDYLITE plating is the best
guarantor against rust and
corrosive influences.





New Super-Performance

Under All Conditions for
The Monocoupe "90"

at \$3375.00

TAKE it point for point—a plane that is comfortable in all weather without getting dressed up to look funny. It's comfortable—you can smoke and talk, no weather too rough, one man moves it in and out the hangar, a power plant that requires less concern over motor service and maintenance than one gives his automobile, one that you can rebuild after the second year for \$15.00—

Monocoupe "90" Performance

High speed	125 M.P.H.
Landing speed	37 M.P.H.
Cruising speed	100 M.P.H.
Climb	1000 ft. per min.
Horse power	90
Length overall	20 ft. 5 in.
Sspan	22 ft. 0 in.
Cruising range	225 miles

The unprecedented popularity of the new design necessitates your order being placed at least three weeks in advance.

MONO AIRCRAFT CORPORATION
MOLINE, ILLINOIS

\$75.00 Buys
Parts for complete
overhaul of Lambert
R-265 Engine

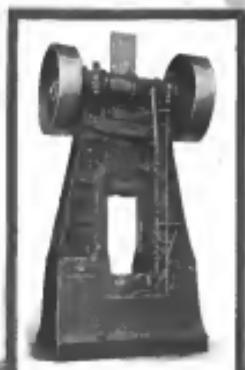
- 1 Cylinder barrel
- 2 Pistons with rings
- 4 Rods
- 11 Valve guides
- 10 Cylinder seat bushings
- 16 Spark plugs
- Complete set of gaskets

DROP FORGINGS FOR RELIABILITY



On Chambersburg Hammers

Every airplane part that must stand up under the constant grind of repeated service is a vital part. Vital parts such as those illustrated above naturally are drop forgings, and just as naturally were forged on Chambersburg Hammers.



Chambersburg Hammers have been used in the production of forged parts for many of the most important names in the automotive industry since its very beginning . . . And in aviation, the youngest branch of that industry, Chambersburg hammers are again associated with the most important names.

CHAMBERSBURG ENGINEERING COMPANY

CHAMBERSBURG . . . PENNA.

Div. by

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BERRY BROTHERS now fills all finishing requirements for the Curtiss-Wright group. This means that the Curtiss Aeroplane and Motor Company, Inc., Curtiss-Wright Flying Service, Curtiss Aeroplane Export Corporation, Curtiss-Robertson Airplane Manufacturing Company, North Aircraft Corporation, Keystone Aircraft Corporation, Travel Air Company and other associated units will use Berryloid Aircraft Finishes exclusively.

Selecting Berry Brothers in face of extreme competition, Curtiss-Wright gave these points consideration:—1. Satisfaction. Berryloid has given oil units in the past; 2. Completeness of the Berryloid line; 3. Prompt service rendered by distributing points throughout the country; 4. Reputation and scientific research behind all Berry Brothers' Finishes.

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Flexibility and durability of the Durval Air
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Planes flying on schedule must stand up day after day—under all conditions of moisture and temperature.

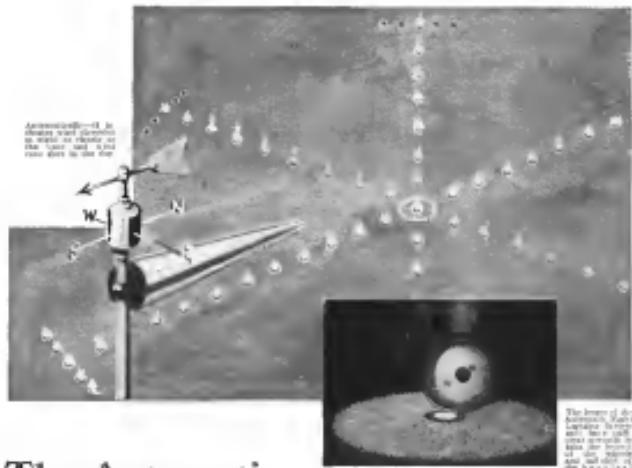
It is a tribute, therefore, to Haskelite's weatherability that it is used in a majority of the country's transport and mail planes. No other plywood has equalled the water-resistance of this blood albumin plywood. Write for engineering data.

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The Automatic NIGHT LIGHTING SYSTEM says: "Land into the wind on the dotted line...."

HANDED by outstanding figures in the aviation world—the greatest contribution to the safety of night flying—an unique, contemplated as established, can be offered you, students without the future of safety this new, simple, and efficient lighting system offers?

It comprises a series of lights, set flush in the ground, one hundred feet apart on the runway. At each end are flush lights fifty feet apart at right angles to the runway. These lights are automatically dimmed by the action of the wind in the wind vane. As the wind changes the correct landing direction is automatically indicated.

This system was selected for the Grosse Ile Airport at Detroit, Michigan—a division of the Detroit Aircraft Corporation—one of the largest and most modern airports in the World—after a careful consideration of all available systems. Learn more about it—see for particulars.

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Don't Fail to Inspect Our Installation at Grosse Ile Airport During Your Visit
to the All American Aircraft Show

Advantages of the System Technically

Indicates true ground level at all times.

Automatic control.

Indicates proper runway to follow.

Indication of wind direction.

Indication of curve length.

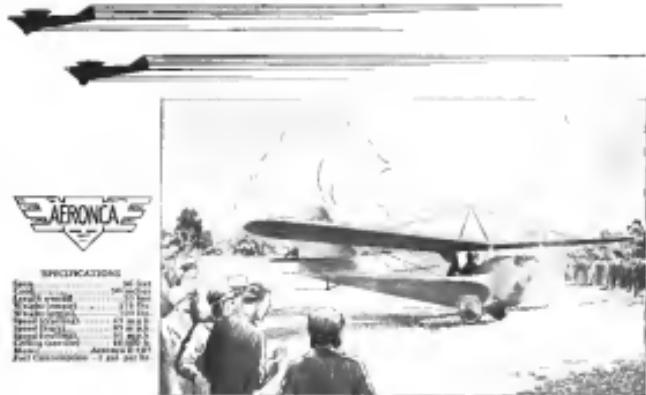
Indicates under the most severe weather conditions.

Shows depth of plane.

Does not blind pilot—(diffused light).

Low operating cost.

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Take-off of official N. A. aeronca 100. One hour and seventeen minutes on two gallons of gasoline.

The Most Talked of Plane in America Today ~

THE Aeronca C-2! Two years ago this name had not even been born. Today it is making aviation history. In design and performance it has revolutionized the field of personal aviation. Instead of depending on tremendous power to pull through the air, aerodynamic efficiency has been increased to the point where an 80 horsepower motor will do the job. Aerodynamic simplicity, aerodynamic economy...the performance of planes with three times as much power. But, unlike other light planes, speed and maneuverability are gained without extra weight. The Aeronca C-2 is the first plane to have aerodynamic simplicity, regardless of weather conditions. Though a glider gradient can easily be Aeronca's glide ratio, its flight performance is so great it is even made redundant because it can experience stability in an appearance of extreme aerodynamic problems.

Airline, Ralph Barnes, the Navy's glider expert, declared the Aeronca C-2 to be the best glider plane ever built. Its long range, rapid rate of climb, and rapid descent, its short take-off and 50 miles an hour landing speed, and its remarkable ability to land in a short gliding angle.

On the other hand, such famous veterans as Frank Hawks,

Charles Chamberlin, Phil Love, Jimmy Doolittle, Eleanor Smith and others expressed the most genuine enthusiasm for the Aeronca C-2. They all agreed that the C-2 has the pronounced feeling of confidence that is absent... no matter what the position of the plane even when very close to the ground.

Flight conditions from such wide extremes are, alone, a big accomplishment. But, to have achieved such a combination of glider safety and sport plane performance in a plane which is now in its second year of production is a record of achievement in a accomplishment that is destined to bring success to the thousands who could not afford to fly before.

It is now in its second year of production. The famous C-2 is now being manufactured at Kokomo, Indiana, by the Motor Lampart and Kokomo Bridge Company. It has sold over one thousand units. Raoul M. Hirsch of Kokomo-Bentley is marketing the C-2. The C-2 is the most popular and most successful airplane in the country. Thousands of former fliers are now flying again. Thousands of former fliers are now flying again. Every month indicates the popular appeal and progress that the Aeronca C-2 is winning for itself.



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THIS Type ALH floodlight is designed for the definite purpose of illuminating large airports and terminals. It is the most powerful, most reliable, and most efficient unit ever produced. The powerful illumination is obtained from eight 3-hr. MAZDA lamps—hence its reliability should some of the lamps burn out, there still remains an even distribution of light on the field. Glare is minimized by confining the light beam to a low height above ground throughout the 180-degree spread. Ask for complete information. Address the G-E sales office nearest you or General Electric Company, Schenectady, N.Y.—manufacturer of lighting equipment, instruments for navigation and flight, engine accessories, and sundry devices for the aeronautic industry.

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The **Stearman** two-seat training plane, powered by a 100-hp. radial engine. Price \$10,000.



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The **Stearman** advanced dual-control plane, powered by a 100-hp. radial engine. Price \$15,000.

EACH A LEADER IN ITS CLASS

Engineered on sound principles that have been proven by years of experience in commercial and military operations. Built by master craftsmen in 15,000 hours of work, each plane is built by the most approved production methods. These three types of Stearman Aircraft are proving every day their superiority in providing safe air transport facilities with economy.

The **Biplane** offers non-stop cross-country under normal flying conditions with a fuel consumption of only 4.5 gallons per hour at cruising speed. Twice the size, powered with a 200-hp. Wright Whirlwind radial of a greater load, approximately 10,000 pounds, with a total of 4,000 cubic feet of interior space, it has demonstrated dependability, safety and economy by flying more than 25,000 miles under all conditions, within the last four months.

In addition to these, the **Stearman Aircraft Corporation** has under con-

struction at the long-time and distinctive types of planes, which, when completed and added to the present group, will make the famous line of the finest and most complete in the industry today. These four include:

(1) A four-passenger plane carrying four tons passengers, two pilots and extra men for "Wimp" motors—flying designed for all weather conditions, with a range of 1,000 miles, and a top speed of 180 miles per hour.

(2) The **Panama**—a six-passenger plane, steel-tube metal

designed, built for heavy duty in record time.

(3) The **Florida**—a single motorized monoplane, built for fast, express and long-distance flying, with a top speed of 180 miles per hour.

(4) A special long-range monoplane—extremely streamlined, designed for record distance flight.

All Stearman planes are different from the ordinary milk station airplane or glider, so quickly older than its surface area. The 67 may easily be transformed into a classified plane or fittings for certain sections are standard. Obviously the planes are identical. Complete specifications, performance data and prices will be furnished on request.

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Designed by
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Built by
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REVOLUTIONARY— STARTLING SAFETY FEATURES

It is my conviction that this 9 passenger plane with a Wright Whirlwind J6 or Wasp Jr. motor is safer than a multi-engine and the plane that can make air transport profitable.

The visibility, stability and maneuverability of the Chamberlin 8-Seater are beyond comparison. Its comfort, control and practical operating features are remarkable. Its wing has non-tailing characteristics without use of slot mechanism. Designed from the pilot's and operator's viewpoint—engineered by experts—built by an experienced organization, it is the costing type for transport lines as well as for sight-seeing and "taxi" service.

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President

CRESCENT AIRCRAFT CORPORATION

Bergen 7216 172 Lenape Ave.
Jersey City, N. J.
Adjoining Jersey City Airport

SPECIFICATIONS

Length	26 ft. 6 inches
Span	48 ft. 2 inches
Weight	4,640 lbs.
Fuel Load	1,200 lbs.
Gasoline Capacity	96 gals.
Cruising Speed	114-120 MPH

Equipment

- Twin and Landing Gear
- Compass
- Brakes
- Lights
- Tail Wheel or Tail Skid
- Metal Propeller
- Steering
- Instrument and other standard equipment

Exceptional Dealer and Distributor assistance not available with any other plane.



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Inland Supersport with Warner Scarab Motor

\$4,985

Inland Sport with LeBlond "60" Motor

\$3,485

A thousand dollar price reduction on the Inland Supersport is the month's best news! Now you can own this speedy little ship for less than five thousand dollars . . . fly it as economically as you can run a motor car.

Inland Sport at "tomorrow's plane today"—an airplane ship of outstanding performance, with an American altitude record and the world's speed record for light aircraft stands to its credit.

Inland Sport powered side-by-side seating to bring greater comfort and the pleasure of business companionship to open cockpit flying. Pilot and passenger can talk face-to-face . . . discuss maps, controls, instruments . . . converse almost as easily as in a motor car. This arrangement is a decided advantage in training, with instructor and student seated side-by-side.

Further details gladly sent on request.



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...air compressor unit
for general compressed air
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The Model F-2 is built
to withstand the most
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An air pump designed
to meet all requirements
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It is built to withstand
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Before you purchase that air compressor for operating spray guns—for cleaning engines and planes—for tire inflation—for general shop work—be sure to consider carefully every feature of Quincy Compressors.

Here is a compressor line of 14 sizes, air cooled and water cooled, from which to select the exactly right compressor for your needs.

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are designed and built to deliver air at the lowest possible cost for power and maintenance.

They are rugged and long lived; and so quiet in operation that one is hardly aware of their presence.

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Face your airport buildings with brick, if you will—but back the walls with Natco Unibacker. You will save weight, reduce cost, strengthen; you will save time without sacrificing durability; you will save money without sacrificing permanence.

Available in various sizes for various thicknesses of walls, Natco Unibacker creates surfaces, establishes a bond with the brick work, so intimate that the facing becomes an integral part of the wall. Building codes recognize the strength of this bond by permitting bearing value to be figured on full wall thickness.

Natco Unibacker, in common with all of the Natco line, offers you:

1. **LOW COST/FIREY-Warren Structural Clay Tile** are absolutely non-combustible. They help reduce a fire's spread potential by 50%.

- 2. **ECONOMY**—The shape, easily handled units are laid at simple settings in,丁ores, labor, material and expense.
- 3. **LOW MAINTENANCE**—Painting, patching and repair work, necessary with most forms of construction, are reduced to absolute minimums.
- 4. **LOW DEPRECIATION**—Rugged, durable, non-combustible Clay Tiles are highly resistant to destruction and decay. Depreciation is usually figured at 1% a year.
- 5. **DECREASED HEAT LOSS**—Natco Unibacker and other Clay Tiles have high thermal insulating values. Heat is either retained and used or given off at great degree.
- 6. **NON-COMBUSTIBILITY**—The Natco Unibacker and other Clay Tiles are non-combustible. They do not burn, nor do they contribute to the spread of fire.

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EARLY this year a sleek new plane was purchased and put into operation by the Goossen Tag Tag Co. Corporation. Our Reasons. First, that a modern business can no longer afford to ignore the many practical advantages of air travel. And second, that we can manufacture better tools for the aviation industry if we have real knowledge of the industry's needs, such knowledge as can only be gained by extensive personal experience.

The Greenfield plane will be at Detroit during the latter part of the All-American Air Show. Our friends both within and without the industry will be made welcome.



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-- Dependable Speed Indication



Model 544 Magneto

WATCHING the performance of aircraft engines by listening to their roar, or noting their speed on indicators located outside the cockpit, is an unwarranted distraction for the pilot.

It is now possible by means of a recent Weston development for the pilot to note the speed of engines instantly, easily and with electrical certainty by the simple expedient of watching an indicator mounted on the instrument panel.

The instrument which Weston allows for this service is known as Model 544 Electric Tachometer.

The principle is not new. It has been applied with marked success for many years in Weston

Tachometers for speed measurements in laboratories, industry and railway and marine fields.

The Model 544 is now in daily service on many passenger and mail planes. It is contributing a most important service by giving timely warning of fluctuations in engine speeds, helping to insure flight safety and providing another scientific unit for assisting complete and positive instrument flying control.

The Model 544 is a small refined generator screwed directly onto the Tachometer coupling on the engine. The voltage generated is transmitted by cables to an indicator, scaled to read in R. P. M. located on the instrument panel. It is easy to install and requires practically no lubrication or attention of any kind.

For complete details write for B. S. 544

WESTON ELECTRICAL INSTRUMENT CORPORATION,
416 Foothill Avenue, Newark, N. J.



Model 201 Indicator.
Rate angle or time
discrepancy. Black dial
diamagnetic markings
and pointers.

Weston
PIONEERS SINCE 1882
INSTRUMENTS



Model 201 Indicator,
with ideal dial and its
minimum markings and
pointer, directly below
the case.



They used to read reports

THE director of General Investor Utilities, Inc., faced a difficult, but not uncommon problem. Their seventeen operating properties lay scattered through eleven states—seventeen colored markers on a map. Dissemination? Yes. Close personal supervision? Well, perhaps.

Then the company bought a Travel Air. Supervision became an accuracy. Thus, seventeen far properties can now be visited in a single day. The static holdings of the company can easily be inspected by the directors on a visit. They used to read reports. Now they make them.

The Travel Air air passenger plane monoplane is unusually fitted to the requirements of flying executives and directors. In addition to inspection trips, it can be put to use as a tax levies. Handsomely equipped, powered with the 300 h.p. Wright Whirlwind engine, it gives speed, passage and privacy in urgent missions. Cruising at a speed of about two

miles a minute, the Travel Air monoplane has a range of 400 miles. Another model, powered with a 420 h.p. engine, has even higher speed and longer range.

Owners of Travel Air planes have the further advantage of always being within easy reach of the nation-wide organization of Curtiss-Wright distributors and importers whose necessary parts and repairs may be had by Curtiss-Wright trained mechanics.

Plane in Boxes. Travel Air has equipped so many progressive companies with these airplane planes that it can supply reliable data on the few operating cost and on the business economies which have been effected. For full information, write Department T-73.

TRAVEL AIR COMPANY
Division of CURTISS-WRIGHT
27 West 37th Street - New York

TRAVEL AIR
A PLANE FOR EVERY PURPOSE

This is one of a series of advertisements directed originally to advertising men. It is often in many industrial advertising men particularly to larger and better. It is printed on these pages as an advertisement to ourselves that McGraw-Hill publishing standards mean advertising effectiveness as well as editorial quality.

Squelching another whispering campaign—



"Look out for that company, it's slipping," said the whisperers. Its product, an assembled unit sold to manufacturers to build into their machines, was of high quality but had been sold only through salesmen and direct mail.

Sales were falling off. The market, conscious of the gossip, was suspicious of the financial strength of the seller. This increasing sales resistance was undermining the morale of the sales staff.

With this serious situation facing it, the company called in an advertising agent who recommended an emergency advertising campaign in a McGraw-Hill publication covering the particular market. The program, the first publication advertising ever used by this company, consisted of color spreads in every issue.

That was only a year ago. Today, aware of the company's comeback, sales are not only mounting but the advertiser's chief competitor has offered to sell out to the new advertiser. *From bottom place to top position is recognition in one year.*

MORAL: Selling is not a choice between salesmen, publication advertising and direct mail but a matter of coordinating all three and using each as a basis of the job to be done.

**MCGRAW-HILL
PUBLICATIONS**

New York Chicago Cleveland Denver Philadelphia St. Louis
Greenville San Francisco Boston London

MOTO METER AVIATION INSTRUMENTS



This 300 ft. diameter and adjustable membrane fuel indicator has been tested over 1000 hours to explore extreme limits of their service performance. Moto Meter aviation instruments are built to withstand temperatures from -60° to +120° F., and pressures up to 1000 pounds per square inch. They are made of stainless steel.

OIL PRESSURE
GAUGE
Model 7004-A 30 lbs



FUEL PRESSURE
GAUGE
Model 7004-A 30 lbs



Another
Danger
Loses its Terror

ICK ON THE wings! A thought just like this to airmen. The improved streamlined design using control means less weight, the possibility of a maximum a revised drafting. Standards are dropped, profits increased.

There are no practical means of preventing the formation of ice. You can't walk out on the wings and stop it off. The thing to do, of course, is change course or climb until you get out of the danger zone.

To do this it is necessary to have an instrument that will give early warning when the temperature falls to the critical point, when a saturated atmosphere means condensation. For this purpose the Moto Meter Ice Warning Indicator has been developed.

The newly efficient mercury cells in a plane the controls are very important instruments that a double ignition system takes care of. It is the responsibility of the Moto Meter Corporation to answer and handle all of the Moto Meter Corporation can make it—whether in saving lives or in.



MOTO METER

Gauge & Equipment Corporation

LONG ISLAND CITY,
NEW YORK, U.S.A.
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THE MEN SHOWN ABOVE (FROM SIX STATES) PURCHASED ARROWS AND LEARNED TO FLY—FREE

ARROW	ARROW	ARROW	ARROW
SPORT "50"	SPORT "58"	TANGERINE	PURSUIT
60 H.P. LeShed	90 H.P. LeShed	90 H.P. Lemkert	100 H.P. KINNER
\$3131.00	\$3535.00	\$3535.00	\$3965.00

An opportunity of a lifetime—free flying instructional! American's leading manufacturer of training and sport planes, together with direct factory representation, offer **FREE FLYING INSTRUCTION**, with the purchase of one Arrow. Not just dual instruction—but—complete Private License Pilot Course with training under the direction of flight instructors.

The Arrow is everything you can ask of a training plane. Safe—dependable—convenient—staunch—airworthy—flying speed—satisfying stimulus. Side by side seating arrangement makes for easy training. Efficiency of performance is outstanding.

Every company shown on the list at the right employ only experienced accredited instructors. Jump on the "band wagon"—make up your mind to accept this unprecedented offer. Better still—write or wire direct to the factory and get more information. Don't put it off—write at once—today.

Your flying school can make you money! Let us show you how to do it. Write for full details of a positive profit making service. We will show how your school can be placed in the big money making class.



ARROW AIRCRAFT AND MOTORS CORPORATION
Hickman, Nebraska

Quick and Sure *with only half the shock*

After years of intensive development work by E. L. Barnes, recognized world authority on parachutes, he has made possible the remarkable aerial camera shown by the motion picture film enlargements on this page. The most elegant man between the top and bottom of the frame is one of our own Wright brothers. Barnes' success is remarkable—the fact that this aerial cinematograph operating section has been trained with such skill that half the sheet is the jumper. Chief among the reasons of this quick opening section is a specially new design of pilot chute which weighs less than half a grain more than the type of pilot chute used heretofore. A standard size of this chute is five feet long, of the paper, independent of the layer of tellurium on crystal.

Decide how much your life is worth. Compare this price with the price of a guarantee. If your life is worth the most—get a policy.

M. 1000—1000'.

Differences of the Business Trends from

(b) Burrofield's law places no restriction. This fact has been attributed to a "conservatism" of the law. Less than half the devices experienced in world wars change results from the spreading of short-period errors.

GO Trusses overall margin shown by any stress study with 1190 pounds of load. Such strength has been made possible by the new method of staggered crossmembers and the use of a top stiffener which provides a large area for the full strength of the box and allows replacement of stiffeners at angle.

ED: None of this has been achieved through word spread movements which spread the福音 message in ways ranging from simple tract distribution to the kind message being explained that has a greater life than our mortal lives in this spreading up-building God's Kingdom.

41 The lack of crystallinity definitely influences the degree of branching in the resulting resin blocks for lamellar when crystallizing like a pseudosolid.

42 The Troposene Chain sharply rounds away from the tail near the zeta shoulders and can be turned on right or left by pulling on the main chain tail clockwise. A twist can never flip both ends with this arrangement.

The *musica sacra* of Palestrina and his contemporaries was the only accompaniment I had. The *harmonium* was so disliked that I have only been able to obtain a small, glass harmonium.

(1) The *bareness* and *dark appearance* is equal power combination to be used for walking and sitting position than that found as other choices.

All of these advantages to want completely developed by F. E. Whan as a person for measurable running under conditions for more severe than a normal running or walking. We shall be able to walk over the long distance as well as the short distance, it gives us a great advantage to F. E. Whan as a person for the running and walking. We can use the F. E. Whan as a person for the running and walking as well as the running and walking as a person for the running and walking.

ASK ABOUT OUR EASY PAYMENT PLANS.

Completely equipped service department for all types of claims. Damage appraisals, statements, books, paint shade and quality.

A new and better adoption SAFETY BELT designed by E. L. Hoffman is now available. Absolutely secure to use, yet quickly and easily released; much simpler and easier to adjust. Wears you when reinforced in flight. It is always set if the way when starting or

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THE AMERICAN FAIRY TALES

 VOLKSBRENNER BUILDING, CINCINNATI, OHIO

POSITIVE PROTECTION ... FROM FIRE

for

THE NEW DETROIT MUNICIPAL HANGAR



Courtesy of Detroit

IN THE new Detroit Municipal Hangar, complete protection from fire is assured by the installation of the Hangar Deluge System—a modern system specifically designed to combat fires in airplane hangars.

When you attend the Detroit Aviation Show at the Municipal Hangar, look for the red sprinkler pipes at the ceiling, and the sprinklers in the floor. Notice, too, the batteries of "Automatic" Deluge Valves along the center columns of the hangar. These sixty-four Deluge Valves operate independently—each controlling one section of the hangar. Should fire break out in any one area, that section will be instantly deluged with water from open sprinklers above and below—extinguishing the fire.

If you see displaying any of your planes or equipment in the Detroit Municipal Hangar, remember that the Hangar Deluge System is keeping silent, alert watch, ready to go into instant action if a fire starts.

Write for Bulletin No. 20—The Answer to Fire Control Problems in Airplane Hangars—which gives you complete information on the Hangar Deluge System.

THE HANGAR DELUGE SYSTEM OF OVERHEAD AND UNDERFLOOR SPRINKLERS

"Automatic" Sprinkler Corporation of America

Executive offices, Cleveland, Ohio

Offices in principal cities



Courtesy of J. A. Nichols

PAY AS YOU FLY... in the world's most dependable light plane

WHITTELSEY AVIAN

WHITTELSEY AVIAN...	\$3845
DOWN PAYMENT.....	\$1358
Balance: Monthly Payments	
HANDLEY PAGE WING SLOTS	
	\$450

All prices F. O. B. Bridgeport, Conn.

MANY thousands, who have never before been able to consider the purchase of a plane can now take up flying with a Whittemsey Avian. The price is down to only \$3845. First payment is but \$1358, and balance can be written off in easy monthly installments.

Quantity production has made this possible—quantity production and a plane that has been perfected and proved in every detail.

The Avian embodies all the latest safety features. Handley Page Wing Slots \$450 extra, which eliminate danger of spins and permit lower landing speed! In the air the Avian's stability is phenomenal.

This plane can be operated economically for business or personal use and at the training school. 20 miles of travel for every gallon of gas in the Avian!

Pilot's say that our plane is "fastest to fly—easiest to land." Write now for complete details of the Avian—and the convenient purchase plan.



What can the Whittemsey Avian do for you according to talk shows? We offer light plane fans such a record of performance.

Write for our catalog. We offer full plans, tool lists, and instructions of the plane.

Whittemsey Manufacturing Company, 30 Howard Street,

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THE OUTSTANDING SPORT AND TRAINING PLANES OF THE WORLD